

Conserving Our Woodcock

Research-based measures to help
the UK's resident population



Game & Wildlife
CONSERVATION TRUST

www.gwct.org.uk



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FOREWORD

One of the many feathers in the cap of GWCT's research bears the cryptic pattern of the woodcock. The Trust has a long and proud heritage dating back over half a century in researching this surprisingly common and yet elusive species. Dr Andrew Hoodless and latterly Dr Chris Heward have followed on from the early research into the species conducted by Dr Graham Hirons in the 1970s and 1980s. Their collective contribution to the international understanding of this geographically widespread and yet under-researched species cannot be overstated. My own study of woodcock through ringing and establishing the Woodcock Network has involved me in international seminars on the woodcock which has shown the high respect given to our Trust's scientists and their work on the species.

What is remarkable is the fact that most of the Trust's research into woodcock has been funded by shooters. This should leave little doubt about what I like to describe as the 'enlightened self-interest' of the shooting community and the significant contribution this makes, not only enhancing our understanding of the species we shoot, leading to ever greater sustainability, but also in implementing habitat management, which is highly beneficial for both wintering and breeding woodcock in the UK. My own experience visiting woodland managed for woodcock provides compelling evidence that this also generates significant gains for many other valued woodland species and all at little or no cost to the public purse.

With so much debate about woodcock and conservation in the UK this report is a significant evidential milestone in our understanding of the species. Having been engaged in the process of woodcock fieldwork for over 15 years I can testify to the hard work that has gone into this body of knowledge. It would be a tragedy if the results of this formidable effort were ignored in the formation of future policy.



OWEN WILLIAMS
Sporting Artist



OWEN WILLIAMS
SPORTING ARTIST



What is remarkable is the fact that most of the Trust's research into woodcock has been funded by shooters





WILLIAMS

INTRODUCTION

We are entering a crucial time for UK woodcock, not just because breeding numbers are falling, but also because their future is rightly on the policy agenda. Resident, breeding woodcock remain on the Red List of birds in the UK, and both the English and Welsh Governments have been petitioned to remove woodcock from the quarry list. The arguments to continue a sustainable harvest of woodcock are founded on the benefits of woodland being retained and managed to support the species, as well as the fact that in some areas residents are absent, so all woodcock there are migrants whose numbers are stable. There is a risk, therefore, that further restrictions on woodcock shooting could be counterproductive. In those areas where resident woodcock do breed, simple guidelines can help protect the breeding birds during the shooting season (see page 32). Research suggests that the main pressure on breeding woodcock in Britain and Ireland appears to be a lack of suitable, connected habitats as woodland becomes increasingly fragmented and less well managed.

The work of the GWCT in recent decades has shed light on many aspects of woodcock ecology and behaviour, and several of these long-term research projects are entering an important phase where data collection draws to a close and intensive analysis begins. Results from some of these projects studying migratory woodcock are due in the next year. This document gives a brief overview of the GWCT research theme as a whole, with a more detailed update on our knowledge and findings about resident breeding woodcock in Britain and Ireland. National surveys carried out in 2003 and 2013 revealed a decline of almost a third in that decade, so we await the results of the next survey in 2023 with concern. In the interests of basing policy on science it would be prudent to wait until the results of that survey are known before making legislative changes. We urge people to get involved in roding counts to help contribute towards these invaluable data.

ANDREW HOODLESS
GWCT Director of Research



ANDREW HOODLESS
GWCT DIRECTOR OF RESEARCH



In those areas where resident woodcock do breed, simple guidelines can help protect the breeding birds during the shooting season





CONSERVATION IN NUMBERS

186

PEOPLE TOOK PART IN
THE GWCT/BTO ANNUAL
RODING SURVEYS IN 2021



.....

3,238

SEPARATE CAPTURES OF
2,638 DIFFERENT WOODCOCK
MADE BETWEEN 2011 AND 2022

.....

37

SCIENTIFIC PAPERS PUBLISHED
BY THE GWCT ON WOODCOCK



A uniquely-numbered metal ring is applied to a woodcock's leg (ringing studies performed under licence). © Chris Heward

KEY INFO ABOUT SIGNING UP



The **2023 GWCT/BTO Breeding Woodcock Survey** will provide an up-to-date assessment of the state of the British and Northern Irish woodcock populations. **But we need help from volunteers like you.**

Participation is simple: register to cover a local survey square, make 3-4 dusk visits to your chosen site, and record sightings of the woodcocks' distinctive display flight. More details can be found at www.bto.org/our-science/projects/woodcock-survey, with updates and registration for 2023 unfolding throughout Spring 2023.



SCAN ME

CHAPTER ONE:

WOODCOCK POPULATIONS

INTRODUCTION

The woodcock is a cryptic, beautiful, and interesting bird. Characterised by its mottled brown, black, and grey colour, stocky shape, short legs, and sizeably long bill, it is an expert in camouflage. It is relatively unknown in many quarters, perhaps because its life is not lived in plain sight – it is most active at dawn and dusk and is generally averse to disturbance. It breeds in rural woodlands, feeding by night on open ground including pasture and arable farmland, so although it is much loved by some people it is rarely seen by most.

Despite this, the woodcock played a surprisingly large role in the early days of British ornithology. As early as the 1890s, monogrammed rings were fitted to the legs of woodcock chicks at country estates across Scotland, Ireland, and northern England. The recoveries of these ringed woodcock during the shooting season were among the first real opportunities to understand the movements of wild birds. Woodcock became the subject of these early ‘citizen science’ endeavours because they were, and still are, a much-loved quarry species that has earned a prominent place in country lore.

To this day, there are still many unanswered questions about this mysterious species but 50 years of woodcock research, conducted by the GWCT, means that we now have a better understanding of the woodcock’s ecology than ever before. Over the last decade, new technology has revolutionised the way in which we study birds and has provided never-before-seen insights into the species’ migration and breeding behaviour. These studies have revealed the epic journeys made by migratory woodcock that spend their winters in the British Isles, as well as highlighting the plight of our small resident breeding population. They have also helped us to better understand woodcock habitat requirements so that we can work to ensure we support their needs.

This document tells the story of GWCT’s woodcock research and how our improving understanding of the species can help inform future attempts to conserve woodcock in Britain and Ireland.



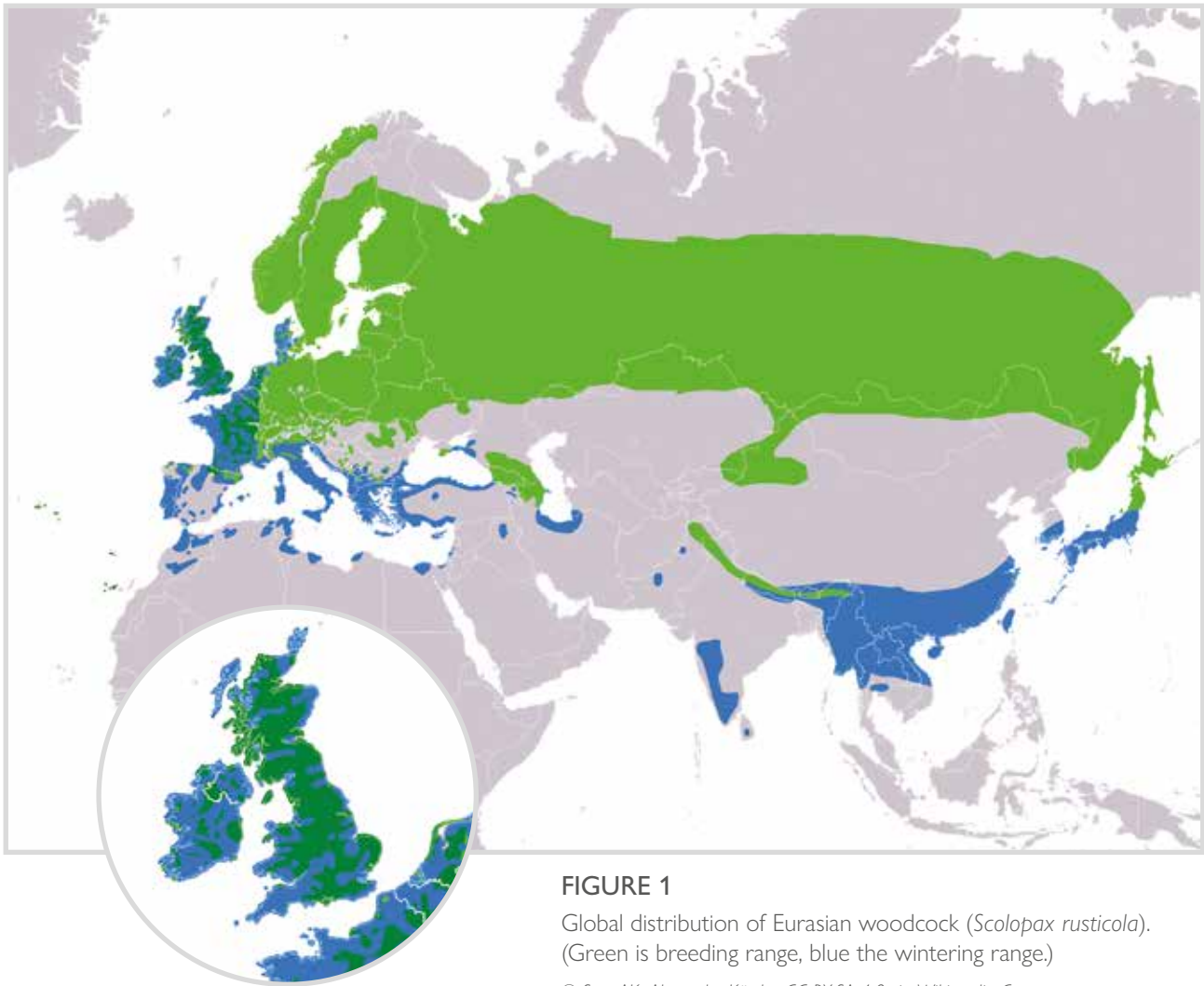
WOODCOCK WORLDWIDE

Woodcock are found in woodland habitats right across northern Europe and Asia, ranging from Britain in the West to Japan in the East¹. Information on the size of breeding woodcock populations worldwide is relatively poor and the accuracy of estimates varies from country to country. By far the largest numbers, however, are known to breed in the expansive northern forests of the Baltic States, central Europe, Finland, Scandinavia, and Russia.

Owing to their diet of invertebrates and the manner in which they probe the ground with their bills to find food, woodcock are unable to feed when the ground is frozen. Birds from these northern and eastern populations must therefore travel south and west to escape the winter freeze on their breeding sites.

Between December and March, the bulk of the European population is concentrated in Britain, Ireland, France, Spain, Italy, and Greece, where conditions are comparatively mild. We estimate that between 800,000 and 1,500,000 woodcock overwinter in Britain and Ireland.

At a global scale, woodcock are classified as being of least concern by the IUCN because of their large, relatively stable population and large range¹.

**FIGURE 1**

Global distribution of Eurasian woodcock (*Scolopax rusticola*). (Green is breeding range, blue the wintering range.)

© SanoAK: Alexander Kürthy, CC BY-SA 4.0 via Wikimedia Commons

The best estimate of their global population from the 2021 European Red List is put at 11.5 million individuals² and they are widespread across their breeding and wintering ranges (**FIGURE 1**).

The conclusion that the global population is of least concern is based largely on numbers for the largest population in Russia, although there are some more localised populations for which trends are either unknown or declining, such as UK breeders. Woodcock monitoring in the main European breeding areas (in Scandinavia and Russia) indicates that the European population is stable, and there is no evidence for a change in the numbers of migrant woodcock wintering in Britain and Ireland.

WOODCOCK IN BRITAIN AND IRELAND

One of the most important things to understand about woodcock in the UK is that there are two distinct groups which, despite being the

same species and genetically no different, are generally separate, behave in different ways and are experiencing different fates. One is resident, breeding here in spring and summer, but staying in winter as well. The other, much larger, group is migratory – breeding elsewhere further north and east and migrating here to overwinter in our warmer climate. The reason this is so important is that the two groups are very different from a conservation perspective. The resident population is much smaller, has been declining in recent decades, and is therefore on the red list for birds of conservation concern in the UK. As these birds are here all year round, they depend on our countryside and our management throughout their lives – meaning not only that they are vulnerable to our activities but also that we should be able to help support them. The migrant birds, which outnumber residents at least tenfold, also have a remarkable story, but their numbers are stable, and the population is not of conservation concern.



RESIDENT WOODCOCK

Woodcock are predominantly woodland birds. They breed only in certain parts of the UK, centred on heavily wooded landscapes with large or well-connected woodland blocks. They are generally more common as a breeding species in Scotland and northern England, but fragmented southern populations remain in areas such as the New Forest and Thetford Forest. In winter, migrant woodcock might be found roosting in practically any wood or copse. Woodcock depend on a diet of earthworms and other invertebrates such as spiders, beetles, and snails, which are obtained by probing the ground with their long, sensitive bills³. Through the winter,

adults regularly commute from their daytime roosts in woodland to where they feed at night on open areas of farmland, grassland, and heathland. In the breeding season, females and their broods forage within woodland in areas that offer enough cover to give overhead protection, but which are open enough to easily move through at ground level, such as thickets and bramble patches^{4,5}. Their cryptic plumage helps them remain inconspicuous during the daytime and their large eyes, placed high on the sides of the head, give them near 360° vision for detecting potential predators.

In spring and early summer, male woodcock perform roding displays at dawn and dusk, which consist of a slow, characteristic flight with an

Did you know?

Woodcock have a small feather on the leading edge of their wings called a 'pin feather'. While not unique to woodcock, these tiny feathers were historically used by Victorian painters and some modern-day artists to create miniature works of art. They have also been used to lift small objects and remove dust from people's eyes.



Painting with a woodcock's pin feather. © Colin Woolf (wildart.co.uk)

accompanying two-part call (a series of three to five low-pitched croaks followed by a high-pitched, nasal whistle). When roding, they fly over woodland, visiting clearings, glades, rides, and woodland edges in order to find a female with which to mate. Females wait on the ground in these open areas and attract a male's attention by calling and flashing the white tips of their tails. Once a pair has mated they build a nest in a shallow depression on the ground using leaves and other vegetation, generally laying a clutch of four eggs which hatch 21-25 days later. The chicks eagerly leave the nest, are able to fly at about 20 days old and fully fledge at 35-40 days.

Britain and Ireland support a relatively small resident breeding population of woodcock. Counts of displaying males give us the best information on breeding woodcock numbers, and the most recent population estimate is based on a national survey from 2013, which suggested 55,241 males breeding in Britain⁶.

Recent work by both the British Trust for Ornithology (BTO) and the GWCT show severe declines in the population size and breeding range of our resident woodcock since 1970. Data from the comprehensive Bird Atlas⁷ indicate that woodcock were present in 56% fewer 10km squares across Britain and Ireland in 2010 compared to 1970, and this led to them being moved from amber to red status on the UK's Birds of Conservation Concern evaluation in December 2015⁸. This downward trend is also supported by the GWCT-BTO national surveys from 2003 and 2013, where 1km squares across Britain containing at least 10ha of woodland were surveyed, and the proportion that held breeding woodcock dropped from 35% to 22%. The British population estimate based on these surveys fell by 29% from 78,350 breeding males in 2003⁹ to 55,241 in 2013⁶. Both data sources suggest regional variation in the rate of decline, with losses greatest in the west and south.

We do not fully understand what is driving the decline in our breeding woodcock, but we expect there to be multiple factors involved as well as regional differences. Changing climate and changes in the suitability and management of woodland in recent times are likely to be important. We are carrying out further analysis of our datasets to look at patterns in the distribution of breeding woodcock with respect to these factors, as well as others such as predation, deer numbers, recreational disturbance, and shooting.

At present, we cannot rule out shooting as a factor contributing to the decline of our resident woodcock. We recommend that woodcock shooting should not take place before the 1 December, to ensure that migrant woodcock have arrived in sufficient numbers to reduce the impact on resident UK populations. We are gathering information to examine the effect of shooting on breeding woodcock numbers and produce guidance on sustainable harvest rates. Recommendations can be found on page 32 of this document, and more information can be found at: www.gwct.org.uk/game/research/species/woodcock.

CONSERVATION IN NUMBERS

130

YEARS THAT LEG RINGING HAS BEEN USED TO STUDY WOODCOCK MOVEMENTS



50

YEARS OF WOODCOCK RESEARCH BY GWCT



2

DIFFERENT GROUPS OF WOODCOCK IN BRITAIN AND IRELAND, RESIDENT AND MIGRATORY



CONSERVATION IN NUMBERS

11.5

MILLION BIRDS
ESTIMATED TO MAKE UP
GLOBAL POPULATION



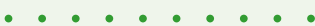
0.8-1.5

MILLION WOODCOCK
ESTIMATED TO OVERWINTER
IN BRITAIN AND IRELAND



55,241

BREEDING MALES
ESTIMATED IN BRITAIN
AND IRELAND IN 2013



29%

DECLINE IN NUMBER OF
RESIDENT BREEDING MALES
BETWEEN 2003 AND 2013



Visit our **Woodcock Hub** page
[www.gwct.org.uk/game/
research/species/woodcock](http://www.gwct.org.uk/game/research/species/woodcock)

MIGRANT VISITORS

In winter we see a large influx of migrant woodcock from breeding grounds further north and east. Migrants typically arrive in all months from October to January, but the timing and numbers vary regionally within Britain and Ireland, as well as annually according to the severity of cold weather on the Continent.



It is very difficult to assess the winter population in the UK with accuracy. To make an estimate, numbers have to be derived starting with the relatively reliable number of breeding males in spring. This is used along with the likely number of females that might also be present, and the number of young they may raise in the year to give a possible number of resident birds in winter. That figure is then scaled up using the proportion of shot birds that are thought to be resident, to give an overall estimate for the total number of woodcock present in the UK in winter. Using this process, and an estimate that around 17% of birds in the UK in winter may be resident, the most recent winter population estimate for woodcock published in the scientific literature is around 1.4 million birds¹⁰. However, the authors note the difficulty of estimating woodcock populations, stating that “*this estimate of wintering woodcocks is highly approximate, but is thought to be of the right order of magnitude*”, and some of the figures used to derive this number have been updated since this calculation was made.



HOW MANY WOODCOCK ARE THERE IN WINTER?



The question of how many woodcock might spend their winters in the UK may seem straightforward but is actually extremely difficult to answer. The fundamental reason is the secrecy of these birds, so that simple counting of those we may see in winter is not an accurate reflection of the number that might be present, camouflaged in the woods and active at night. Therefore, the usual approach to estimating winter numbers has been:

1. Take the relatively reliable estimate of breeding males in spring.
2. Assume a broadly similar number of females.
3. Account for the loss that would be expected through the summer.
4. Add the average number of young each female might rear in that season.
5. Use the proportion of resident breeders to migrants to calculate the total number present in the winter.

There are many difficulties with this process. Putting aside the several assumptions that must be made in steps 1-4 which provide a baseline number of British breeding birds that are present in the winter, the main challenge is establishing the relative numbers of resident to migrant woodcock in Britain in the winter.

The various sources of data that can be used to estimate the percentage of our winter population that are resident range from ringing studies, which suggest around 14%, to isotope analysis of feathers, which can suggest as low as 2%. The root of this variation probably lies in the inherent differences between different areas. Some areas of the country such as Cornwall and Wales have no breeding woodcock and almost all woodcock present in winter will be migrants. Other areas, such as some of

our study sites in Hampshire, have relatively high breeding populations and therefore even when winter migrants arrive, the proportion of residents may be as high as 20%.

Ringing studies have been carried out for many years and can give very reliable data. They tend to be focused on areas which have a relatively high population of resident breeders, so probably only accurately represent these pockets of the UK. Isotope studies are also dependent on where sampling takes place, how many feathers come from these different sites, and how the analysis is carried out. Isotope studies have the potential to give a truly national proportion – if the sites are well spread and cover all areas. However, they will inevitably be biased towards areas where woodcock are shot.

This wide range of possible resident proportion has a huge impact on the final figures of any estimate. If we take a reasonable starting figure of 137,500 resident woodcock present in Britain in the winter, and a resident bird percentage of 2-17%, this leads us to a winter population estimate of between 808,800 and 6,875,000.

The generally accepted figure at present for the British winter population estimate is somewhere between 800,000 and 1,500,000, which would mean that between 9-17% of woodcock present in winter are resident.

CHAPTER TWO: GWCT RESEARCH

INTRODUCTION

The GWCT has been carrying out woodcock research since the 1970s, with a programme of studies that has only intensified as it has progressed through the decades, each building on those that have gone before so that a more detailed picture has developed. This complex species provides many avenues to study, and the relative scarcity of robust information that came before means that our understanding of both breeding and migratory woodcock has grown enormously along with this body of work.

GWCT research has focused on two main areas: **1) Breeding ecology**, and **2) Migration research and winter ecology**.

This document offers a summary of the research to date focused on our breeding woodcock. The GWCT is committed to improving our knowledge of the species and helping support its conservation. A full report on the findings of our research on woodcock migration and population status carried out alongside the studies reported here will follow in 2024.

Woodcock: Helge Sørensen (birdphotos.dk)



WOODCOCK BREEDING ECOLOGY: GWCT RESEARCH SUMMARY

1970s-1980s

WOODCOCK BREEDING SYSTEM STUDIES

The earliest studies with radio transmitters and handheld receivers began to give the first understanding of roding ranges, finding that they are: for the purpose of locating females, overlapping rather than exclusive and an average size of 88 hectares.



2000s

SONOGRAM STUDIES

Pioneering work recording individual calls and using sonograms to identify their characteristics unlocked how the number of woodcock seen during a survey relates to the actual number present. This enabled the first reliable estimates of woodcock numbers and became the recognised technique for estimating woodcock populations.

1990s

HABITAT USE STUDIES

In a large lowland wood in Derbyshire and an upland site in Angus breeding woodcock were radio-tracked, nests were located, and broods were monitored. This allowed GWCT staff to study habitat preferences. In the lowland wood, ash and sycamore areas were favoured over beech stands, and areas with a shrub layer were most heavily used by females with broods. In the upland area, naturally regenerating birch thickets were most heavily inhabited with conifer plantations rarely used.



THE EARLY DAYS: WOODCOCK BREEDING STUDIES

In the 1970s and 1980s, early projects used radio transmitters to better understand the male woodcock's roding flight. Birds were caught at night and radio transmitters attached to their backs. They were then monitored by a team of researchers spread throughout the wood with hand-held radio receivers as well as static receivers on trees or poles.

This project was the first of its kind and discovered that:

- Woodcock roding is not for the purpose of maintaining an exclusive territory, as had previously been accepted, but is instead for locating and attracting females⁵.
- Roding ranges overlap considerably, with areas shared by multiple males⁵.
- Once mated, males stay with a female for several days until egg-laying begins. They then return to roding and some males may mate with further females through the season⁴.
- This lack of exclusive territories, variation in the amount of roding by individual males, difficulty in distinguishing individual birds, and finding that males sometimes rode over a number of separate woodlands meant that previous

population estimates were unlikely to have been reliable, and it informed the development of the new techniques for population estimation that we use today⁴.

- The estimated size of roding ranges, according to the technology of the time, was between 43 and 134 hectares (an average of 88), or around 0.9 square kilometres^{4,5}.

Continued radio-tracking and nest-finding in the early 1990s showed that females typically nested in more open woodland stands with dog's mercury, bluebells, or sparse bramble cover in a lowland study area. In an upland study area, they favoured mature birch woodland with a bracken or grass field layer. When feeding, adult woodcock frequented areas of denser, younger trees at both sites and broods were also taken to these areas. The use of dense, younger trees or stands with a good shrub layer is thought to be related to avian predation risk, as both sparrowhawks and tawny owls preyed on woodcock at these study sites.



2003 FIRST NATIONAL WOODCOCK SURVEY

Volunteers help complete woodcock surveys on 807 sites across Britain.



2008

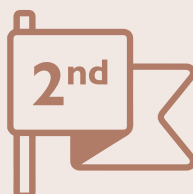
The development of robust roding count interpretation enabled publication of the first breeding population estimate for Britain of 78,346 males.

2017-2021 GPS LOGGER STUDIES

These allowed the GWCT to study roding ranges in more detail in Sherwood Forest, revealing that they were 110-130 hectares, considerably larger than was previously thought. The methods were then applied to study habitat usage at another site in Hampshire and compare with sites used by migrant woodcock breeding in Scandinavia and Russia, the results of which are in analysis.

2013 SECOND NATIONAL WOODCOCK SURVEY

This gave a population estimate of 55,241 males, suggesting the population had fallen by almost a third in 10 years.



SONOGRAM STUDIES: SOLVING THE MYSTERY

Prior to this landmark work, it had been impossible to identify the number of woodcock in a particular area during a survey because the surveyor cannot tell individual birds apart by observation. When surveying, each roding flypast is called a 'registration'. In a single evening, it may be possible to record 20 or 30 registrations at a good site, but as the birds are not identifiable, it is not possible to know whether these are performed by one active male or several different males.

To address this, the GWCT undertook studies in the early 2000s which used sonograms to record and identify individual woodcock from the

characteristic calls that they make during roding flights in the breeding season (FIGURE 2).

The researchers recorded calls made by different woodcock, measured the minute differences in specific characteristics of each call, and demonstrated that these measures allowed most individuals to be distinguished. This was critical to assessing woodcock numbers and allowed us to calculate how the number of woodcock 'registrations' relates to the number of woodcock that would likely be present in the area at that time¹¹. For instance, a survey with 4-6 registrations would equate to 2-3 individual roding males whereas a survey yielding 18-20 registrations would suggest that 6 separate males were displaying.

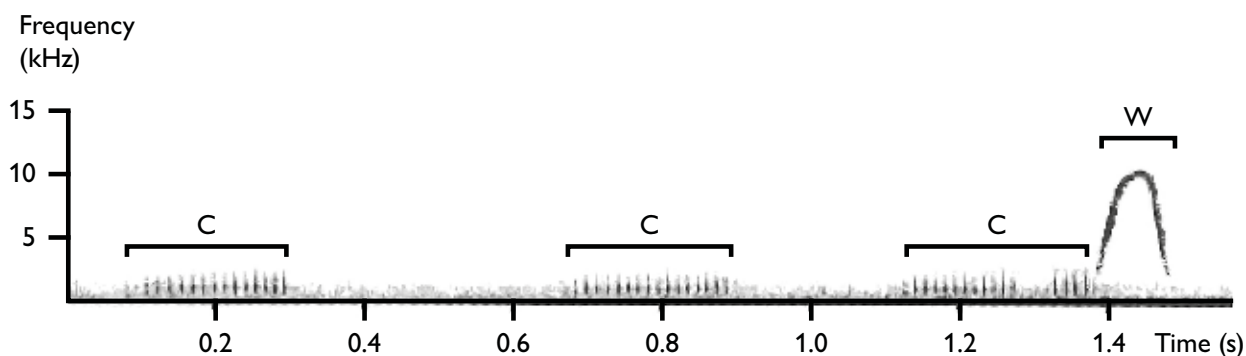


FIGURE 2

Sonogram of a typical woodcock call, showing three croak elements (C) and one whistle (W)¹¹.

NATIONAL SURVEYS AND NUMBERS

The first national survey of breeding woodcock in Britain took place in 2003. Surveys were carried out in conjunction with volunteers from the British Trust for Ornithology. Volunteers counted woodcock at over 800 1km squares throughout Britain. The sample of squares was randomly selected, in a way that accounts for variation between regions and different woodland coverage. These sites were each surveyed three times between May and June for an hour, starting from 15 minutes before sunset.

The information from these surveys was collected and analysed using the method developed from the sonogram studies described above, to give an estimated breeding population in Britain of 78,346 males. Our method also provides a

'confidence interval', the likely window either side of the estimate that the true value is thought to lie within. This suggests that we can be 95% sure the population was between 61,717 and 96,493 males. This estimate was much higher than previous ones made between the 1970s and 2006, but was still thought likely to be lower than the real number⁹.

In 2013, the national survey was repeated to give two important pieces of information – the second national population estimate using these techniques, and the first opportunity to compare from the 2003 baseline figure. This work gave a population estimate of 55,241 males (the 95% confidence interval around this figure is 41,806 to 69,004 males) and suggested that the population had fallen by almost a third in ten years, a finding that fits with data from general bird monitoring schemes⁶. The next national survey will take place in 2023.



Varied ground cover beneath young birch. Maintaining shorter grass through occasional mowing further increases variation in structure © Chris Heward

RESEARCHING HABITAT FOR BREEDING WOODCOCK

We cannot support our resident woodcock without a clear understanding of what constitutes good breeding habitat. There are certain long-understood themes – woodcock are associated with woodland; they eat earthworms so need soft, healthy soil; are secretive and therefore likely to be averse to disturbance; and as a ground-nesting species, are vulnerable to both mammal and bird predators. However, these general points are not enough to guide us as to specifically how we might help woodcock. Several of the GWCT's research projects have helped add detail to the knowledge we need to provide areas where breeding woodcock can thrive.

Early studies using radio tags helped us better understand woodcocks' habitat usage and their movements in the breeding season. These showed for the first time that all adult woodcock alter their feeding behaviour during the breeding season compared to their winter routines, regardless of whether the individual is involved with a nest or brood¹². In winter, adult woodcock feed on open pastures at night but this becomes less common in the breeding season, when they switch to feeding

under cover in woodland during the day¹². This is probably because in the summer open land becomes drier and earthworms become harder to find, crops and ungrazed meadows become too tall, and there are fewer hours of darkness to safely feed in the open. When feeding in woodland, woodcock tend to use areas where trees are relatively small and close together, with a layer of shrubs or herbaceous plants dense enough to provide cover but through which they can still easily travel. These are often areas of young sycamore or birch with an field layer of dog's mercury or bramble, but birds avoid areas that are predominantly beech or pine^{3,13}.

However, when choosing a nesting site (rather than a feeding site in the nesting season) woodcock use woodland areas with more open ground vegetation, which still have overhead cover from trees¹³. This use of different nesting and foraging habitat nearby to each other suggested that woodcock need a mix of different types of habitat to thrive, a finding that was confirmed by later studies¹⁴. Combined with the need for open roding areas and winter-feeding pastures or fields, this demonstrates that the landscape as a whole needs to be suitable for an area to fulfil the varying needs of woodcock throughout their life cycle.

ANDREW HOODLESS

DIRECTOR OF RESEARCH

Andrew Hoodless has had a lifelong interest in birds, which quickly turned into a fascination for woodcock as a challenging species to study. Woodcock are unpredictable to observe, difficult to study and at the time their ecology was poorly understood, which increased the appeal of working on them. Woodcock research remains difficult, with winter night surveys being most successful in terrible weather when it is easier to creep up on the birds undetected.

Andrew took over from Nick Sotherton as GWCT's Director of Research in July 2020, meaning that one of his first challenges was to oversee more than 60 full time scientists in the different research teams through the coronavirus lockdowns which brought enormous disruption to fieldwork.

Despite these challenges, Andrew has ensured that the high quality and enormous breadth of GWCT research has continued. In the south, wader and predator monitoring is enabling the development of more effective management for declining species such as lapwing and curlew and lowland game research is investigating how best to rear and manage gamebirds. International fisheries research collaboration through the Interreg SAMARCH project is identifying movements and mortality of young salmon and trout at sea. The latest farmland ecology research is helping to develop best practice in healthy soil management and creating space for biodiversity across agricultural landscapes across the UK and with European partners. In the English uplands a long-term experiment is underway to quantify the effects of heather management by cutting and burning, along with a study of merlin habitat and breeding requirements. In Scotland the GWCT has been instrumental in driving forward new methods of surveying mountain hares. From grey partridge conservation and the GWCT's Sussex Study, through the pioneering

demonstration farm research projects at Allerton and Auchnerran, across to monitoring feral goats with drones in Wales, the breadth of GWCT science is fascinating.

Andrew retains his passion for wader research and woodcock in particular, where he began his research career studying their breeding ecology under Dick Potts in 1990 and has led several major studies since. He still loves the night-time fieldwork and despite his appointment to Research Director bringing increased pressures on his time, he takes any opportunity he can to contribute to data collection.

Andrew sees two main areas as the most important aspects of woodcock research. First, a better understanding of the influence of habitat, climate, and predators on woodcock breeding success. Most immediately we need to determine what habitat and predator management measures will help the British and Irish breeding populations. Second, more accurate assessments and monitoring of woodcock populations, including national assessments of mid-winter numbers. The GWCT has developed a reliable method of counting displaying woodcock in spring which has been adopted in other countries, but this monitoring needs to be expanded and co-ordinated. One thing that could help this would be improved dialogue with the relatively few researchers working on woodcock across Europe. In Andrew's words: *"Research always benefits from dialogue and collaboration, and we have reached a time where it will be especially important for delivering an effective pan-European woodcock conservation strategy."*

Helped by recent advances in technology, GWCT science has made great strides in understanding woodcock ecology and populations. Tracking individual birds has been fundamental to understanding migration timing, routes, and learning about habitat use in the breeding season. As Andrew said: *"Now that we know there is an issue with our resident population, we must produce guidance for practitioners and work to facilitate local recovery. GWCT research has always been about informing best practice and finding solutions as well as identifying issues."* ■

“

Now that we know there is an issue with our resident population, we must produce guidance for practitioners and work to facilitate local recovery

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NATIONAL SURVEY FINDINGS FOR WOODCOCK HABITAT

More habitat studies followed, using the information that was collected during the 2003 national survey. When woodcock counts were carried out for that survey, information was also collected about the habitat surrounding the survey sites, so we analysed these two streams of data together to help understand what sort of areas woodcock were choosing to breed in¹⁴.



Dense birch typical of thickets favoured by feeding woodcock.

This work found that woodcock occurred more often in large, well-connected woods that are made up of a mixture of species and habitats. This confirmed what we had found in the previous studies, that woodcock need diversity of habitats; open areas such as rides, glades, and wood edges are used for roding, whereas nesting tends to occur in relatively open woodland reasonably close to the edge of such areas, thicker areas are used for foraging when chicks are young and for protection from predators. Before the mid-twentieth century, woodcock also bred in smaller areas of woodland.

This recent retraction to more heavily-wooded areas might be connected to the woodland's diversity, its management or the fact that smaller woods are more likely to dry out.

We found woodcock numbers were generally higher in woods that included at least some broadleaved trees, but that this depended on the tree species in question. Conifer-dominated woodlands were used, but this was more likely if conifers were interspersed with broadleaved stands. Beech woods rarely support woodcock, possibly because their tough leaves are not palatable to earthworms and they grow in fairly dry areas, so the soil is not ideal for woodcock feeding. Birch woods are much more likely to host woodcock, with wetter soil more amenable to probing bills, leaves breaking down quickly and the soil supporting earthworms and other invertebrates.

Woodcock also tend to be found in greater numbers further from built-up areas that are presumably associated with more human activity and therefore disturbance. The ideal areas seem to be far from human settlement, in a landscape with plenty of varied, connected woodland patches.



More open woodland with bluebell cover used for nesting.



Permanent clearing in mixed woodland likely to be visited by roding males.



Open, damp ride edge suitable for roding and feeding at dusk.

RODING COUNTS

The roding display flight is a fascinating aspect of woodcock breeding behaviour, and the development of the GPS logger allowed us to study roding behaviour in more detail. Firstly, GWCT scientists developed a more effective method of catching woodcock at dusk which incorporated using a model decoy woodcock on the ground and playing an audio recording of part of the roding call, followed by a chasing call that is used by male woodcock in confrontations. This combination lured roding males down into mist-nets and meant that the catch rate was nine times higher than when attempting to catch without the decoy and calls¹⁵.

Using this method, 45 male woodcock were tagged across three woodland sites in Nottinghamshire, over three years. Thirty-seven of these tags were recovered so their data could be used. The results shed new light on roding ranges and habitats¹⁶.

Woodcock roding ranges were larger than had previously been thought, although there was wide variation between different birds. Some ranges were much larger, some were smaller, some connected different areas of woodland, some were more focused (FIGURE 3). These differences may be

because of a hierarchical system where more dominant males are able to access the best areas with the most females.

Despite this variability, and the fact that this technique is different to those used previously so the results may not be comparable, these findings still suggest that roding ranges may be much larger. The previous study in this area with work carried out using radio transmitters in the 1970s suggested the average total roding ground, for males radio-tracked for 100 days, was 88ha in size^{4,5}. In this study, more than half of the males studied displayed over larger areas than that in a single night.

As well as this, the routes we recorded didn't adhere to the traditionally held view of roding as a series of repeated circuits. Instead, the paths taken were often far more varied, but the areas covered by each individual over consecutive nights were broadly similar.

In terms of the habitat that male woodcock choose, it was traditionally thought that roding occurred over rides and clearings within woodland. The results of our tracking confirmed this view – and identified a particularly strong association with permanent open areas such as rides and glades, rather than temporary ones such as clear-felled stands¹⁶.

FIGURE 3

An example of the roding tracks of five male woodcock, each represented by a different colour¹⁶.





CONSERVATION IN NUMBERS

807

1KM SQUARES ACROSS BRITAIN AND IRELAND COVERED BY VOLUNTEERS COUNTING WOODCOCK FOR THE FIRST NATIONAL SURVEY

.....

2,421

HOURS OF WOODCOCK SURVEYING CONTRIBUTED TO THE FIRST NATIONAL SURVEY



.....

37

GPS LOGGERS RECOVERED FROM WOODCOCK TO STUDY THEIR MOVEMENTS DURING THE RODING SEASON

.....

111

HECTARES – THE ESTIMATED AVERAGE SIZE FOR RODING AREAS BASED ON GPS LOGGER STUDIES IN THE 2010s

.....



.....

80%

THE AMOUNT OF COPPED WOODLAND IN THE UK LOST BETWEEN 1940 AND 1990

.....

1 DEC

THE DATE BEFORE WHICH WOODCOCK SHOULD NOT BE SHOT IN BRITAIN AND IRELAND IF THERE IS A BREEDING POPULATION PRESENT LOCALLY

.....

CHRIS HEWARD

HEAD OF WETLAND RESEARCH

GWCT Head of Wetland Research, Chris Heward, has been working on woodcock projects since he joined the Trust in 2011. He began as a field assistant studying the winter ecology of woodcock, moving on to complete his PhD on their breeding ecology and behaviour.

Chris has been central to the various long-running woodcock studies that the GWCT has overseen. Having fallen into studying the birds by chance, he now finds it hard to imagine a species more appealing than the woodcock. He said: *“All the things that make them frustrating to work with are precisely what make them so fascinating. The challenges in observing and catching woodcock make fieldwork difficult, but this secretive nature means that we still have so many interesting questions yet to answer.”*



Chris oversees the GWCT's Wetland Research programme and heads up woodcock research at the Trust. One of his aims is to find practical conservation solutions aimed at reversing resident woodcock declines. This is difficult, because woodland changes slowly over the course of several decades, and management aimed at woodcock may take a relatively long time before it delivers measurable benefits. However, with sensible management guidance based on science and experience, he is optimistic that the answers will come.

There are other factors that require consideration when developing conservation guidance for woodcock, particularly because our resident breeding woodcock and our migrant winter visitors are separate populations. Chris said: *“It is our resident birds that are declining, and if we are to ensure woodcock continue to breed in the UK, we need targeted conservation measures to improve breeding success and survival. We need to remember that the requirements may differ between resident and migrant populations.”*

The GWCT manages a long-term monitoring project, the national Breeding Woodcock Survey, in conjunction with the BTO. The data gathered provide a valuable insight into the health of the resident breeding population across the country. Chris said: *“We're always looking for volunteers to take part, especially if you can help us cover remote survey locations in northern England and Scotland.”*

Like much of GWCT's research, woodcock studies are reliant on the engagement of land managers. The cooperation of those we have worked with over the past half century has been critical to advancing our knowledge of the species, and in understanding how we can better support them. Discovering and understanding local woodcock populations gives an insight into their secretive world. Chris said: *“If you want to know more about the breeding woodcock in your area, roding counts are by far the best way to monitor your local population. As well as a chance to observe this fascinating behaviour, over successive years it can provide a measure of how populations are changing.”* ■

“

If you want to know more about the breeding woodcock in your area, roding counts are by far the best way to monitor your local population

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CHAPTER THREE: WOODCOCK CONSERVATION

WHY ARE RESIDENT WOODCOCK NUMBERS FALLING?

GWCT research has helped increase our knowledge of woodcock in recent decades, but that alone does not help support the species. Applying this understanding to develop conservation guidelines is our best chance of reversing the downward trend in breeding woodcock numbers.

The main challenge woodcock face is fundamentally the same as many species in the modern countryside, that of habitat loss; although there are additional pressures, such as higher predator numbers and more human disturbance.

At first sight it may seem that the amount of woodcock habitat should be rising; woodland cover in Britain has increased since the 1940s, but the type of woodland has changed. Between 1940 and 1990, the amount of coniferous woodland has tripled but the amount of coppiced woodland has decreased by over 80%. Although conifer

plantations can be used by woodcock, it is usually the young, relatively open stands that still support ground vegetation. When the canopy closes and vegetation below cannot survive, these areas become unsuitable for woodcock, along with many other species³.

British woodland has been changing over the past decades, and the evidence is that this will continue without an active shift in approach. One study found fewer young trees, a decrease in rides and glades, and a marked drop in the mix of ground plant species in woodland in the thirty years between 1971 and 2001¹⁷. All of these characteristics that are being lost are important to woodcock. Coupled with increased grazing and browsing by rising deer populations, the changes that we are likely to see to British woodland in coming decades suggest that good habitat for breeding woodcock will become even scarcer, and that this is already likely to be one of the driving factors in local woodcock declines in southern and eastern England³.



WHAT CAN WE DO TO HELP SUPPORT THEM?

| ASPECT OF LIFE CYCLE | WHAT THEY NEED | HOW TO PROVIDE |
|---|---|--|
|  <p data-bbox="204 636 536 712">FEEDING IN BREEDING SEASON</p> | <p data-bbox="619 389 976 501">Young trees, close together with ground cover. Shrubby areas, or young plantation.</p> <p data-bbox="651 517 944 741">High earthworm/ invertebrate numbers. This may be provided by different species, e.g. sycamore and dog's mercury, birch etc.</p> | <p data-bbox="1056 412 1401 555">In large, even-aged woodlands, increase stand diversity by thinning and replanting.</p> <p data-bbox="1046 577 1410 721">Wind-blow and ash dieback may provide opportunities for replanting or allowing natural regeneration.</p> |
|  <p data-bbox="229 1066 507 1097">NESTING AREAS</p> | <p data-bbox="619 943 976 1048">Woodland with more open ground vegetation but cover overhead.</p> | <p data-bbox="1056 904 1401 1084">Consider the woodland felling plan carefully to ensure a rotation where some more mature stands are always present.</p> |
|  <p data-bbox="236 1496 501 1527">RODING AREAS</p> | <p data-bbox="619 1373 976 1478">Open areas associated with woodland. Rides or glades, woodland edges.</p> | <p data-bbox="1056 1276 1401 1576">Consider widening rides or creating new glades by selective felling of three or four adjacent trees. Cut back bramble and bracken every two or three years to prevent encroachment in clearings.</p> |
|  <p data-bbox="236 1926 501 2002">WINTER FEEDING AREAS</p> | <p data-bbox="635 1785 960 1921">Pasture, stubbles, rape crops near to woodland, with healthy soil and high earthworm numbers.</p> | <p data-bbox="1046 1688 1410 2024">Consider the cropping pattern close to woods where woodcock are known to breed. Ideally, ensure some pasture within 500m. Zero or minimum tillage benefits numbers of soil invertebrates like earthworms.</p> |



Before: In a privately owned oak woodland in Hampshire 50 hectares of woodland have been cleared to create habitat for breeding woodcock.



After: Once clearings have been made they have been replanted at different densities with cleared flight lines and gaps in the canopy.



HABITAT MANAGEMENT FOR BREEDING WOODCOCK: GWCT RECOMMENDATIONS

The following management recommendations are made based on our experience of the past fifty years and the body of research we have carried out at the GWCT. This document explores what we now know, what we still do not know and what we continue to work on. The research effort continues, and we need input from those who have breeding woodcock on their land to help support our scientific work.

If you plan to implement the following advice, please get in touch. We are interested to hear how these recommendations are used and to what effect. We would also recommend making simple baseline 'roding counts' before management begins, to help measure any subsequent change. We are happy to provide survey instructions and advice, please email: woodcock@gwct.org.uk.

Based on our research and experience, woodcock appear to favour large woods (>30ha) and benefit from woodland diversity. They use clearings and woodland edges for display and feed at twilight; tend to nest predominantly within 100m of woodland edges; and use young, dense woodland for roosting, feeding, and rearing young. Cessation of woodland management and loss of traditional techniques such as coppicing are likely to have contributed to woodcock declines.

Management techniques that encourage the establishment of young woodland, through clearing and natural regeneration, and that increase stand age structure and shrub diversity are likely to benefit woodcock.

The chances of encouraging breeding woodcock to colonise a new site or recolonise an area where they are locally extinct are slim, given that woodcock only disperse over short distances. These recommendations are therefore likely to be useful at sites where woodcock currently occur and there is a desire to increase numbers or for woodland within about 15km of known breeding woods.

The following measures are likely to increase the suitability of woodland for breeding woodcock:

- Create, reinstate, or widen woodland rides to provide breaks in the tree canopy. Ideally, rides should be at least 8m wide.
- Mow rides and clearings to produce accessible grassy feeding and display sites where bracken does not dominate. Mow the central, grassy portion of rides annually in late summer-autumn. Cut back encroaching bramble or other shrubby growth at ride edges every 3-5 years.
- Create clearings by felling small areas of trees, e.g., where rides intersect. Keep some of these areas permanently clear of trees and allow some to naturally regenerate.

- Allow patches of natural regeneration by early successional trees such as birch and willow at woodland edges or within parts of large clearings.
- Coppice species such as hazel or sweet chestnut. Coppice coupes often need fencing from deer to aid regrowth.
- Create and reinstate clearings and young woodland using a little-but-often policy. Over time this creates a mosaic of woodland types and ages. If habitat creation is too large or synchronous, young woodland will mature simultaneously and become unsuitable at the same time.
- Plant new woodland in places where it can expand existing woods or be used to 'connect' fragmented woodland blocks. Deciduous woodland, except for beech, is preferred by woodcock.
- Periodically remove marginal vegetation along sections of ditch or pond edge where these features occur within or close to woodland. Create wet features that retain moisture into late summer.

Managing habitat on a small patch scale every few years can be uneconomical in terms of hiring equipment or a contractor. Working with neighbours over a larger scale may be necessary to reduce costs.

There are still gaps in our knowledge of how to create optimum woodcock habitat, mostly related to the scale of management required to secure a viable local population of breeding birds. For large woods (>100ha), our current thinking is that stands of at least three age classes are desirable and rides and clearings should comprise 10-20% of the woodland area. Because it nests on the ground, the woodcock's eggs and chicks are vulnerable to predators. Predator management specifically for woodcock is unrealistic, but there may be a benefit from fox control carried out as part of a game or wildlife management programme and the impact of this also requires further study.



Small muddy areas beside woodland are likely to be used as feeding sites, especially during dry weather. © Chris Heward

BENEFITS TO OTHER SPECIES

The management advice we offer here to help support breeding woodcock is also expected to benefit other wildlife species by providing the types of habitat that they are known to use. This has not been tested in scientific studies; but following the offered advice for managing to support breeding woodcock can reasonably be expected to help the following species as well.

Most British woodland butterflies favour open glades/adjacent woodland, for example:



SILVER-WASHED
FRITILLARY



SMALL PEARL-BORDERED
FRITILLARY



WOOD WHITE¹⁸

Some species require young growth woodland, including:



HIGH BROWN FRITILLARY



PEARL-BORDERED
FRITILLARY



HEATH FRITILLARY¹⁸

Birds associated with open space within woodlands are also likely to benefit from open glades or areas maintained for breeding woodcock, particularly:



EUROPEAN NIGHTJAR^{19,20}



TREE PIPIT²¹



WOODLARK^{19,22}

CHAPTER FOUR: SHOOTING WOODCOCK

REDUCING THE IMPACT OF SHOOTING ON RESIDENTS



The GWCT advises all those who wish to shoot woodcock to exercise particular care and improve their knowledge of local populations, thus enabling the shoot to minimise their impact on resident birds.

Globally, the woodcock is secure and migrants to the UK are abundant. We do not believe that a ban on woodcock shooting would help recover our resident woodcock, in the long term, for three reasons. First, there is an indication, at a national scale, of a reduction in hunting pressure over the last 20 years, with many people deciding voluntarily that they no longer wish to shoot woodcock. Second, a ban might remove the motivation for landowners to manage their woods in ways that will maintain suitable habitat for woodcock. Third, parts of western Britain have no history of breeding woodcock, but host large numbers of migrants, so shooting in these areas does not put residents at risk except during cold spells when residents might move south and west.

The most recent estimate for the number of woodcock shot during the winter in the UK stands at 140,000 (120-170,000)²³. In Europe, it is believed the largest numbers of woodcock are shot in France, Greece, and Italy. An estimated 144,099 birds are shot every winter in Italy²⁴ and over a million woodcock are thought to be shot in France annually²⁵.

So far, there is little indication that current levels of hunting are influencing the trend in the woodcock's population on a European scale, but GWCT intend to improve our understanding of this with upcoming studies. It is important that the possible impacts on resident populations are considered separately because these populations are known to be undergoing declines. Declines in resident woodcock may be driven by low breeding success, most likely arising from change in habitat quality or rates of nest and chick predation, but these populations will then be less resilient to additional losses associated with shooting.

Until we better understand the reasons for the decline in our breeding woodcock and the effects of shooting, we believe it would be prudent for those that intend to shoot woodcock to:

1. Avoid shooting woodcock early in the season

Although migrant woodcock begin to arrive in October and November, at most sites across the UK numbers continue to build throughout the autumn/winter and do not peak until December. Delaying shooting until the majority of these migrants, that originate from stable continental populations, have arrived reduces the risk of any possible impact to vulnerable resident populations. Beginning shooting after the 1 December provides a useful rule of thumb.

2. Improve their understanding of their local woodcock populations before shooting

We advocate improving local knowledge about both the presence of resident breeders and the numbers of woodcock typically present at different times during the winter. Roding counts can be used to detect breeding woodcock where they occur, and over several years provide an indication of local population trends. In autumn/winter, a gradual increase in the frequency of woodcock sightings helps track the arrival of migrants and indicates the safest time to begin shooting (see above). This might be judged by counts of flighting woodcock at dusk, flush counts during autumn pheasant drives or seen at night during predator control activities. At most sites, migrants will vastly outnumber residents, providing a noticeable change in abundance once migrants have arrived. Information and survey forms can be found on our website at: www.gwct.org.uk/game/research/species/woodcock/help.

3. Show restraint even where resident birds are absent

Restraint when shooting woodcock makes sense even in areas where there are no local breeders, because we know from our satellite tracking and annual ringing of woodcock that the majority of migrant woodcock are extremely faithful to the same wintering site year on year. Overshooting will therefore break the migratory link with your shoot and is likely to lead to fewer woodcock being seen in future.

4. Shoot flight lines with caution

Shooting woodcock flighting from woodland at dusk carries a higher risk of overshooting. We advise gauging woodcock numbers across known flight lines first and then deciding on a bag, preferably only targeting half the flight lines once per season.

5. Curb shooting in freezing weather

We have conducted research to understand the effect of cold weather on woodcock. Every effort should be made to reduce additional mortality when woodcock are at higher risk of starvation and predation during freezing spells. We are aware that most shoots stop shooting woodcock before a statutory cold weather suspension comes into force after 13 days. Our current advice is that shooters should stop shooting woodcock after four days of frozen conditions and allow the birds at least seven days to recover after the end of the cold period before shooting recommences.



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