HOPE FARM
Farming for food, profit and wildlife
Barn owl hunting at Hope Farm
INTRODUCTION

When we bought Hope Farm in 2000, for us, it was unique. The RSPB manages more than 140,000 hectares (ha) in the UK, so there aren’t many habitats we don’t have practical experience of, but at that time a conventional arable farm was one of them. We knew two things: life is challenging for all who rely on farmland and, perhaps more worryingly, that we didn’t know all the answers. We still don’t. But we have learned many important lessons – not least that a productive, arable farm can be full of wildlife and produce good quality food.

Today, it is clear the production and environmental challenges facing farming remain inextricably linked: production is completely dependent on our natural environment, and our environment is shaped by how we farm. The way we farm today must protect our ability to farm in the years to come.

I’m a born optimist – it helps in my job! Whilst no farms are exactly the same, I am fortunate to see examples across the UK of farmers rising to the challenges. Some replicate our learnings from Hope Farm, some help us manage farms better. It shows that these challenges can be overcome, but it needs us all to play our part. I’m committed to doing my bit. I hope you will be too.

Whether as a farmer, policy maker or interested member of the public, I hope you enjoy reading this celebration of Hope Farm and the account of our first 12 years as arable farmers.

Martin Harper
RSPB Director of Conservation

Many of the practical lessons learned on Hope Farm have led to the Farmland Bird package, which has gone a long way to help farmers make the most of stewardship schemes.

As the century moves on, the pressure of population growth, climate change, dietary change and increasing energy costs will make the work at Hope Farm ever more focused. There is a need to increase food production, maintain a healthy balanced environment and to do it all with less impact.

I strongly believe that the RSPB, working with farmers, can help to achieve all these goals, so that future generations can still enjoy the countryside. Positive changes are already taking place, and in the spirit of partnership, far more can be achieved.

Michael Sly
Cambridgeshire farmer
IN TR O D U CTIO N

Chris Knights / rspb-images.com

Corn bunting with food for its chicks
**WHY IS THE RSPB INTERESTED IN FARMING?**

Farmland is the dominant habitat in Britain. Arable farming alone covers more than 5.8 million hectares. As well as its vital role in food production, agricultural land provides a range of other services and supports a wide array of important wildlife.

Farming practices have changed considerably in recent decades. Aided by technological advances and rewarded by public funding, farmers were asked to produce more food on their farms. Reductions in farmland biodiversity – the variety of wildlife – have been attributed to this greater specialisation in cropping, as well as greater intensification in crop management. This was particularly evident in the 1970s and 1980s, when many bird species fell into steep decline and some contracted in range. Other wildlife, including arable plants and insects, also declined during this period.

To address this, it is vital to investigate the causes for these declines and demonstrate realistic solutions, which can increase wildlife within profitable farming.

The RSPB has researched the specific reasons why birds such as skylarks, linnets and tree sparrows have been lost in such numbers from our countryside. Having diagnosed the causes of the declines and tested solutions to halt and reverse them, we make recommendations that our agricultural advisers can promote amongst the farming community.

We believe it is possible to successfully integrate conventional, commercial arable farming with targeted management for farmland wildlife. To help demonstrate this, the RSPB decided to buy an arable farm. As a result of the generosity of our membership and supporters we were able to buy Hope Farm.
Cropping pattern and habitat management at Hope Farm in 2012

**KEY**

- Winter seed food
- Oilseed rape
- Spring beans
- Winter wheat with skylark plots
- Summer insect food

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Hope Farm is a 181 ha mainly arable farm in Cambridgeshire. Over the last century, changes at Hope Farm have in many ways mirrored changes in the UK arable landscape, particularly in the east. Until the 1970s it was a mixed farm with beef cattle and 40 ha of permanent pasture, with short-term grass leys integrated into the rotation. Arable crops, sown in spring, included wheat, barley, linseed and field beans. In the mid-1980s it became more economical to convert the farm solely to arable crops sown mainly in autumn.

We wanted to use Hope Farm to build on our knowledge of arable farming and to help develop and encourage wildlife-friendly practices. We recognised the need to bring in expertise to carry out farm operations and we use agricultural contractors for day-to-day cropping operations and habitat management.

When the RSPB bought the farm in 2000, a three-year rotation of autumn sown crops, typical of many farms in the area, was continued: wheat–wheat–oilseed rape. Arable farms employ crop rotation, with different crops grown in successive years in the same fields, to allow greater control over weeds, pests and diseases, as well as to improve nutrient cycling and soil condition. Autumn sowing is the dominant practice for establishing crops on heavy clay soils, such as at Hope Farm, as these crops are more reliable and more profitable than spring-sown crops.

During the last 12 years the farm has been instrumental in demonstrating to the farming community, and beyond, that profitable arable farming and increasing wildlife can go hand in hand. Implicit in our strategy was the desire to demonstrate a “best practice” Environmental Stewardship, Entry Level Scheme (ELS) agreement, by introducing habitats such as wide flower-rich or grass margins, wild bird cover, uncropped areas and lenient hedgerow and ditch management.

New features were introduced to demonstrate how ELS could deliver the “Big Three” requirements of farmland birds – summer and winter food and safe nesting habitat – both in-field and along field boundaries.

Through careful consideration of the quantity and positioning of these habitats, we have seen an incredible increase in bird numbers. If such increases were replicated elsewhere, they would reverse many of the declines in farmland wildlife that have occurred. Farmers, policy-makers, farm advisers and farming organisations from across the UK, Europe and beyond have visited Hope Farm to see first hand how we have successfully balanced crop production and wildlife management.
ALTERING A ROTATION

2000–2005
At Hope Farm, we continued the previous three-year rotation of autumn-sown wheat and oilseed rape (year one: wheat; year two: wheat; year three: oilseed rape). First wheat varieties were typically sold as cattle feed, while second wheat varieties were sold for bread or biscuit making. The oilseed rape produces oil-rich seeds that are crushed to extract the oil for animal feed and human consumption.

By not altering the rotation, we could produce a firm baseline of information about the farm’s cropping potential and its wildlife. We changed rotation only during the harvest year 2003–04, when autumn-sown and spring-sown beans replaced autumn-sown oilseed rape after low rainfall led to poor germination of the latter, a factor not confined to Hope Farm.

2005–2012
We included field beans permanently in our rotation from the 2006 harvest. Initially, these were equally split between autumn-sown and spring-sown, but latterly we have drilled all the beans in spring.

Field beans brought many benefits. They allowed spring cropping, which permitted lapwings to return to the farm as a breeding species, making use of the bare soil and open fields for nest sites, and the low growing crops to raise their chicks safely. Field beans helped reduce our overall fertiliser applications too, as they are legumes and fix nitrogen from the atmosphere into the soil.

Our cropping pattern also diversified, undoubtedly helping wildlife. Initially we had better blackgrass control too, which is important in allowing subsequent wheat crops to grow well, allowing us to retain an over-winter stubble that provided a food source for birds during the winter. However, retaining over-winter stubble led to difficulty in establishing the beans in spring, so we now permit initial cultivations to take place post-harvest and sow a cover crop, such as mustard, to protect our soils and improve soil organic matter content.

By introducing field beans, we therefore adopted a four-year rotation (year one: wheat; year two: oilseed rape; year three: wheat; year four: field beans). We changed our variety of wheat to one that is orange blossom midge resistant, avoiding the need to spray insecticides during the breeding season. We also changed the way we established our oilseed rape, adopting a broadcast method rather than traditional drilling. This gave considerable savings in crop establishment costs.
Oilseed rape
Cultivations at Hope Farm
OUR OBJECTIVES: HABITATS AND CROPS

As with most farms in 2000, only a small area of Hope Farm was entered into a government agri-environment scheme designed to help wildlife. The previous owner had entered into a Countryside Stewardship Scheme (CSS) in 1994, and was paid to plant and manage some hedgerows and to create a few two-metre rough grass margins. This provided some wildlife benefit, but a greater range of habitats was needed on the farm to stabilise and increase populations of farmland birds and other wildlife. For birds, we achieved this by providing:

1. Seed food and berries through the winter
2. Insect food for chicks in the spring and summer
3. Safe nesting habitat, both in the fields for ground-nesting birds and around the boundaries for hedge, or scrub nesting birds.

Over the last 12 years, we have greatly enhanced the diversity of habitats. With our agricultural contractor, we have identified where to grow our crops and where to create vital habitats for wildlife. Other areas managed for wildlife are often in less well yielding areas or awkward corners, making both financial and ecological sense. These wildlife areas have been created using a mixture of options within the current agri-environment scheme, Entry Level Stewardship (ELS). Some other areas have been used to research new agri-environment solutions, some of which have subsequently entered the scheme. The ELS agreement runs for five years, providing an income of £30 per hectare, for beneficial management of habitat that already existed, as well as creating new habitats.

1. SEED FOOD THROUGH THE WINTER
We quickly changed our set-aside requirement from industrial cropping to rotational fallow stubbles, increasing the over-winter seed food for birds. However, the stubble habitat was reduced when set-aside was discontinued in 2007.

In addition to stubbles, we provide over-winter seed-bearing cover crops that support large numbers of finches and buntings. These cover crops include triticale, wheat, barley, kale, fodder rape and linseed. We have also trialled leaving small areas of conventional crops unharvested, as an alternative to cover crops.

2. INSECT FOOD IN SPRING
We have considerably expanded and diversified our network of field margins to boost invertebrate numbers. These invertebrates, important in their own right, are a vital component of food for chicks. Many fields on the farm now have six-metre wide margins. These range from typical rough grass margins, established under the old CSS agreement, to sown legume mixes (nectar flower mixes) and wild bird seed mixes, through to flower rich seed mixes, to support a variety of wildflowers such as butterflies, moths, and bees. Some areas have also been used to research new solutions, some of which have subsequently entered the scheme.

We have taken other steps to boost insect numbers, including switching to a variety of wheat that is resistant to orange blossom midge. This means we can avoid using a harmful broad-spectrum insecticide on our wheat crops at the end of May or early June, the peak nesting season for many birds. We have also created wet features along our ditches to retain open, standing water throughout the summer for birds and invertebrates to use.

3. IN-FIELD NESTING HABITAT
We tried and tested skylark plots, small bare areas in autumn-sown cereal fields, which are now an option in ELS. Two plots per hectare take around 0.3% of the crop area out of production, but increase skylark productivity by 50% (see pages 26–27). Including spring beans into our rotation has reduced fertilisers over the whole cropping cycle (see page 33), and led to lapwings holding territory in most years since 2006.
The UK produces around 15 million tonnes of wheat annually, approximately 2% of global production. Since we purchased Hope Farm, the selling price of wheat has varied enormously, from as little as £55 per tonne to more than £190 per tonne.

Growing a field of wheat requires careful management. This often starts immediately after harvest, when the stubble is cultivated. The way we cultivate the fields has changed over the last 12 years. Our contractor replaced the plough-based system, in which the soil was turned over to a depth of 25 cm, with a reduced cultivation system, in which soil disturbance is typically only to the top 10 cm of the field. This was based on agronomic and economic decisions.

Use of the latest technology reduces the cost of establishing crops, requires fewer cultivation passes, and makes it cheaper and quicker to sow the crops. The wheat is sown in the autumn, typically in September or October.

Hope Farm is a conventional farm, so uses pesticides and inorganic fertilisers to help grow crops. This mirrors the decisions of many farmers, not only locally, but on more than 95% of farms in Britain. Pesticides are designed to protect crops by killing things that can be harmful to yield or quality: for example, herbicides remove pernicious weeds, insecticides remove insect pests and fungicides kill fungal infestations. We aim to minimise our use of pesticides on the farm, for example through choosing pest-resistant crop varieties where possible.

Pesticides and fertiliser are only applied in suitable weather conditions to prevent spray drift onto adjacent habitats or leaching into watercourses. Applications of pesticides and fertiliser are carefully targeted towards the needs of the crop, using the latest technology available. Our agricultural contractor receives independent advice from an agroinsectologist to maximise their effectiveness.

Crop rotation is a vital part of pest management, as is the use of natural pest control. We encourage this through the provision of habitats such as beetle banks, although the pest control benefit from these tends to be close to the field edges.

Autumn applications of herbicides aim to help the crop get off to a good start. Fields are monitored regularly, typically receiving a late autumn herbicide spray if competitive weeds such as blackgrass are present. In spring, fertiliser applications begin to promote growth after the winter hiatus. Monitoring of the crops for pest and disease threats and use of pesticides, when considered necessary, continues through to harvest – typically in August. The moisture content of the grain at harvest is critical. If it is greater than 15% then drying costs will be incurred.

Crop yields fluctuate markedly between years, often dependent on the weather, particularly rainfall, at key points in the growth cycle. However, despite this we’ve largely maintained or even improved wheat yields at Hope Farm – demonstrating that helping wildlife does not necessarily mean compromising the amount of wheat we grow.

Our “first wheat” yields rose from 8 tonnes per hectare in 2000 to more than 11 tonnes per hectare in 2008. They have declined since, primarily due to changes in variety and recent drought conditions (see Figure 1 on page 13).

The cost of producing a tonne of wheat can change dramatically between years, as can the price it is sold at. As an example, in 2004 our first wheat yielded an average of 10.8 tonnes per hectare. We were able to produce a tonne of wheat for £48.18 and sell it at £60 per tonne, a profit of £11.82 per tonne. In 2011, the cost of producing a tonne of wheat had increased to £100.44, primarily due to increased fertiliser and pesticide costs (see Figure 2 on page 13). Yields in 2011 averaged 8.6 tonnes per hectare, selling for £153.62 per tonne with a profit of £53.18 per tonne.
FIGURE 1: AVERAGE FIRST WHEAT YIELDS AT HOPE FARM 2000–2011

Average yield (tonnes/hectare)

Year


8.0 10.0 12.0

FIGURE 2: COST OF PRODUCING A TONNE OF WHEAT IN 2011 (£)

Machinery operation £41.43
Herbicides £3.98
Fertiliser £6.65
Fungicides £3.90
Seed £20.76
Other sprays £23.72
FARM ACCOUNTS: HELPING ALL TO PROFIT

Helping wildlife while continuing to be profitable is the cornerstone of our work at Hope Farm.

Since we bought the farm we have used agricultural contractors to manage the cropping. Our current contractor is based locally and contract farms 4,000 ha in the area. Being contract-farmed means that we pay realistic commercial rates for our on-farm work. The income from the farm is divided between the RSPB and the agricultural contractor, similar to other farming contractual agreements.

As the land owner, the RSPB receives a set-payment – the fixed return. This and the cost of producing the crops, such as the seed, sprays and operations, is deducted from the total income from cropping (which is made up of the sales of the crops, farm subsidy payments, and any compensation for lost income during our trials work on the farm). This leaves the “divisible surplus”, which is divided between the RSPB and the agricultural contractor on a 23%:77% basis. Our contractor gains the greater proportion of the surplus to mitigate the cost of owning and maintaining the farm machinery.

We publish our accounts annually. To view them, please visit www.rspb.org.uk/hopefarm

EXAMPLE: THE ECONOMICS OF HOPE FARM IN 2011

In 2011, the cost of producing our crops – 60 ha (148 acres) winter wheat (variety: Scout), 63 ha (156 acres) oilseed rape (variety: Grace); 28 ha (70 acres) field beans (variety: Fuego) – was £82,924.70, plus the cost of agronomy (£1,865.40). The total income in 2011 was £187,044.13, generated from the sales of crops and a European Union CAP subsidy, the Single Payment Scheme (SPS).

Subtracting production costs (excluding agronomy costs) of £82,924.70 from the income from crop sales and the SPS, leaves a balance of £104,119.43. Further subtracting the £35,607.60 RSPB fixed return leaves a divisible surplus of £68,511.83. This is split in accordance with our contract farming agreement, providing us with 23%, or £15,757.72. When added to our fixed return, RSPB income from arable cropping operations at Hope Farm in 2011 was £51,365.32. This income is subject to management labour costs and tax liability. We received an additional £2,719 for our Environmental Stewardship agreement.
One of the advantages of using a contractor is the transparency with which the RSPB can assess the costs of either producing crops or managing for wildlife. The RSPB and rural property advisers, Smiths Gore, have assessed the profitability of managing farm land for wildlife in England, and we believe it is good news for farmers.

The analysis shows that farmers could make more money from growing seed crops for birds, or nectar crops for insects, than from growing wheat in the same areas.

Smiths Gore have also analysed the economics of environmentally beneficial measures deployed at Hope Farm. It shows that Entry Level Stewardship (ELS) payments fully compensated for the income foregone in changing from crop production to environmental management, and that thoughtful use of the options available can provide valuable income for a farmer.

**ECONOMIC ASSESSMENT OF AGRI-ENVIRONMENT OPTIONS**

<table>
<thead>
<tr>
<th>Winter wheat on 0.16 ha</th>
<th>Skylark plot (undrilled)</th>
<th>Skylark plot (sprayed)</th>
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<tr>
<td>Income</td>
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<td>Variable costs</td>
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<td>Gross margin</td>
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**AN EXAMPLE OF ECONOMIC ANALYSIS OF SKYLARK PLOTS**

This analysis compares 100 skylark plots (a total of 0.16 ha), established at crop drilling or by later spraying out of the crop, with an equivalent area of winter wheat.

**ASSUMPTIONS (BASED ON JUNE 2009 FIGURES)**

- Wheat yield: 8.6 tonnes per ha
- Wheat value: £170 per tonne
- Income from plots: £5 per plot
- Variable costs:
  - £50/ha seed
  - £200/ha fertiliser
  - £170/ha sprays
  - Knapsack spraying plots after drilling: 6 plots/hour @ £9/hour labour.

For further details and help in doing your own calculations, visit the Smiths Gore website. [www.smithsgore.co.uk/publications](http://www.smithsgore.co.uk/publications)
In the first two years, the RSPB changed very little at the farm, as we wanted to collect baseline data on the wildlife. This allowed us to see how our habitat management and experimental techniques affected the farm’s wildlife. RSPB research staff, volunteers and other experts carried out detailed surveys of birds and other wildlife throughout each year. Improving habitat for birds is a priority but we also believe that changes we have made, and continue to make, will benefit other species. For example, increasing insect numbers also means more food for insectivorous birds. Therefore, the monitoring programme included butterflies, moths, dragonflies, surface and crop dwelling insects, small mammals, hares, arable plants, fungi and bats, amongst others.

To assess the changes in bird populations, particularly key farmland species, we monitor both breeding and wintering bird numbers each year.

### TABLE 1: NUMBER OF TERRITORIES OF THE FARMLAND BREEDING BIRD INDEX SPECIES ON HOPE FARM 2000–2011

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- **High conservation concern**
- **Medium conservation concern**
- **Not of current conservation concern**
Breeding bird numbers at Hope Farm are recorded using Common Bird Census (CBC) methods, where bird activity of all species is recorded and accurately mapped over 10 to 12 visits, from April to early July. This allows us to build a picture of the number and locations of territories for each species, every year.

The Hope Farm breeding bird index (Figure 3) illustrates the average change in the number of territories of the 19 key farmland species, which formerly comprised the Government’s Quality of Life farmland bird indicator. Of these 19 species, 17 have held territory on the farm since 2000, with only rook and tree sparrow absent (see Table 1, page 16). Nesting habitat for rooks is limited on Hope Farm and tree sparrows, once common in the area, are now only rare winter visitors.

By 2011, the Hope Farm breeding bird index showed that this suite of farmland birds had increased by an average of 211% since 2000, a remarkable achievement. This is in stark contrast to the stable, or even slightly declining, population trends of the same species across England over the same period.

Many of Britain’s farmland bird species of greatest conservation concern across the UK have increased in abundance at Hope Farm over the 12 years. Skylarks, starlings, linnets and yellowhammers have all increased considerably, whilst grey partridges, lapwings and yellow wagtails have colonised the farm. We believe this is due to provision of safe nesting habitat, plentiful invertebrate food during the spring and summer, and abundant winter seed food.

**FIGURE 3: BREEDING BIRD INDEX AT HOPE FARM 2000 – 2011**
Many studies have identified a lack of winter food, causing high mortality during winter and reduced breeding condition, as one of the main causes of declines in many farmland birds. At Hope Farm we provide winter seed food through wild bird cover crops, occasional unharvested crop headlands and, for a time, we provided over-winter stubble, to help reduce the over-winter mortality rate.

As with the breeding bird monitoring, we carry out regular surveys to assess how birds have responded to this increased supply of food. Surveys are carried out across the whole farm on one morning in December, then again in January and February. The results are stark. The first winter surveys in 2000–01, showed the average number of yellowhammers recorded across the three surveys was just one. This had risen to 173 by 2010–11, and many other species have shown similar increases.

The overall response to management work undertaken at Hope Farm, from 16 key species, has been even greater than for breeding birds – primarily due to increased provision of winter food (see Figure 4 below). The number of birds recorded during the winter 2010–11 was exceptional for recent times. This was largely due to the large numbers attracted to wild bird cover crops during the unusually hard winter weather. The food provided by the wild bird cover crops may have helped birds survive the winter better, potentially helping to increase the numbers of birds able to nest in the following breeding season.

Our hedgerow management has also changed from annual hedge cutting in August to rotational cutting every third year. This has provided considerably more berries on the bushes for winter thrushes, such as redwings and fieldfares, and has improved nesting habitat for yellowhammers and whitethroats.

**FIGURE 4: WINTER BIRD INDEX AT HOPE FARM (2000–01 TO 2011–12)**
Yellowhammers and tree sparrows feeding in the snow
WILDLIFE ON THE FARM: SURVEY RESULTS

PLANT SURVEYS
Professional botanists and volunteers monitor plants on different habitats on the farm. Surveys cover the field centres and crop edge, including the first metre of crop, in early May and then again in late June/early July. Results show that the floristic diversity of field margins increased with a total of 168 species in 2009, compared with 103 in 2000. These included the nationally scarce broad-leaved spurge and slender tare.

This increase is partly explained by the RSPB deliberately sowing some species, such as ox-eye daisy, to encourage butterflies and bees, but more than 40 new species were recorded which were not deliberately sown. Eighty-three of the same plant species were recorded in both surveys and more than 50 species were found within arable fields.

In both the 2000 and 2009 survey, the number and diversity of non-crop plants was greatest at the edge of the field margin and decreased with distance into the field.

BUTTERFLIES
We monitor butterflies regularly, as they are a very important component of farmland wildlife. They are also, as adults and larvae, eaten by a number of bird species. At Hope Farm, 26 species of butterfly have been recorded, 20 of which are regularly found. The most common include large and small whites, red admirals, small tortoiseshells and meadow browns. The trends at the farm reflect the national trends of the Butterfly Monitoring Scheme. Data collected over the last 11 years shows that numbers consistently peak in early July. Yearly fluctuations occur: both 2003 and 2009 had high counts of migrant painted lady butterflies, whilst 2006 saw low numbers of small tortoiseshells, in common with national trends. Experiments
have shown the provision of 6-metre wide native grass margins, with wild flowers to provide nectar, increase the attractiveness of the field margins on Hope Farm for butterflies. The nationally scarce white-letter hairstreak was recorded at Hope Farm for the first time in 2010.

**Moths**
Staff and volunteers have recorded more than 300 moth species using light traps at different locations around the farm. The most notable are two Biodiversity Action Plan species – white-spotted pinion and square-spotted clay. Both are closely associated with elm. Square-spotted clays have been confirmed as breeding on the farm, after the discovery of feeding caterpillars.

**Dragonflies and Damselflies**
Volunteers have helped monitor the dragonflies and damselflies that use the seven ponds on the farm. Cambridgeshire supports 22 species of dragonfly and damselfly, 15 of which have been recorded on the farm. The azure damselfly has been the most common species recorded so far.

**Small Mammals**
Twenty-four species of mammal have been recorded at Hope Farm. Monitoring of mammals, mainly rodents such as mice, shrews and voles, was carried out across the farm during the period 2002–2004, using safe and harmless Longworth traps. Six species were recorded, with common shrews being the most abundant. Water shrew was recorded only once. There was considerable variation between years, with fluctuations in the population of field voles in particular. Most small mammals were found in oilseed rape fields and wide field margins. Barn owls and kestrels commonly hunt these mammals along the field margins and beetle bank, a raised bank between two fields sown with tussocky grasses.

**Bats**
The Cambridgeshire and Bedfordshire Bat Groups surveyed bats on Hope Farm in 2000. Four species were recorded in small numbers: a pipistrelle species, brown long-eared, noctule and Daubenton’s bats. Bats are most common along hedges and tree lines and close to water, and tend to avoid the more open areas of the farm. A further survey in 2009 showed changes in bat abundance and diversity. There has been some increase in the number of bats at Hope Farm but not the number of species. Four species were recorded in 2009: common and soprano pipistrelles, noctules and a *Myotis* species (either Natter’s or Daubenton’s bat). Pipistrelle bats were the most common and accounted for approximately 90% of the bats recorded. Common pipistrelles were found in the farm yard, and in the villages of Elsworth and Knapwell. Soprano pipistrelles were particularly associated around the ponds created in recent years.

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**Butterfly Species Recorded on Hope Farm**
- Small skipper
- Essex skipper
- Large skipper
- Clouded yellow
- Brimstone
- Large white
- Small white
- Green-veined white
- Orange-tip
- White-letter hairstreak
- Small copper
- Brown argus
- Common blue
- Holly blue
- Red admiral
- Painted lady
- Marbled white
- Small tortoiseshell
- Peacock
- Comma
- Speckled wood
- Wall
- Gatekeeper
- Meadow brown
- Ringlet
- Small heath
THREE VITAL REQUIREMENTS
The principal factors that limit populations vary between individual species, but as a whole, farmland birds have three main requirements – the “Big Three”:

- a safe place to nest
- food in spring and summer for their growing chicks
- food and shelter over the winter.

At Hope Farm, we have been able to provide all these needs through careful use of our Entry Level Agreement (part of the English agri-environment scheme) and good farming practice.

DELIVERING THE BIG THREE FOR YELLOWHAMMERS
Yellowhammers have responded positively to our management at Hope Farm, with 33 territories recorded in 2011, compared with 14 in 2000 when the farm was first purchased. Nationally, yellowhammers have continued to decline (by 15% since 1995*).
NESTING HABITAT
Yellowhammers nest in or alongside hedges or ditches. We have wide field margins alongside our hedges and ditches, and cut our hedges in rotation, once every three years. This produces improved nesting habitat, particularly through scrubbing up of the hedge bases.

SUMMER FOOD
Both chicks and adults need insects to feed on throughout the summer. Flower-rich mixtures, beetle banks and field margins provide perfect habitats for many species of insect. Sympathetic management to improve access to these margins for birds allows improved foraging conditions.

WINTER FOOD
This is essential if yellowhammers are to survive during the winter. Wild bird seed mixtures, over-winter stubbles and unharvested wheat strips have provided valuable seed resources like cereal grain. By providing more overwinter seeds we have increased the wintering flocks from an average of one in winter 2000–2001 to 173 in 2010–2011.

*Source www.bto.org/volunteer-surveys/bbs/bbs-publications/bbs-reports
Uncropped margins of arable fields provide important areas for wildlife within the farm and help protect waterways and hedgerows. Rough grass margins provide nesting sites for birds, such as grey partridges, and over-wintering habitats for insects. Wild flower margins can increase the number of pollinating insects. Field margin options, available in agri-environment schemes for many years, are currently in 40% of Entry Level Stewardship agreements in England.

Grass-dominated margins have less wildlife than those that contain a higher wild flower content. Without management, flower-rich margins can deteriorate, with the flowers rapidly becoming dominated by coarse grasses. At Hope Farm, we’ve looked at how we can maximise the benefits of these margins through a series of trials.

The first floristic grass margins, sown in 2003, were part of the Sustainable Arable Farming For an Improved Environment (SAFFIE) project. The original trial, which lasted from 2004 to 2006, compared the novel management technique of scarifying with the conventional technique of mowing. Scarifying, or power harrowing, involves disturbing the ground annually with a power harrow to provide 60% bare ground. It was envisaged that this bare ground would encourage beetles and annual wild flowers, as well as improve access for birds to feed on seed and insect food within the margin. The study found that margins were important for many invertebrates such as beetles, butterflies, sawflies and bees. Populations of beneficial insects increased by up to 80% and these can act as natural pest control agents. Increased abundance of food (insects and seeds), and greater accessibility to these resources, also resulted in greater bird usage of the margins.

While the results were positive, the feedback from policy makers was cautious, and scarification has yet to appear as a management option in Environmental Stewardship.

We revised the trial to compare whether, in the long term, scarification continues to support a diverse vegetation structure, and to test the optimum frequency of scarification required. The revised trial tested a new treatment, biennial scarification, against margins scarified annually and those managed according to existing Environmental Stewardship guidelines (no scarification).

Early results showed that biennial scarification gave a good diversity within the grass mixes, continuing to provide more bare ground and suppressing the vegetation height (compared to other areas of the margin that were not scarified). If this is the case, biennial scarification will reduce management costs, as it will only be required in alternate years. It may also slow the loss of the sown seed component, and the rate of colonisation by pernicious invasive species (for example, creeping thistle) over time. Further evaluations are planned during 2012.

A second trial aimed to develop a successful means of adding a floristic component to established grass margins – rather than having to create flower-rich margins from scratch. Ten species of flowering plant were broadcast sown into experimental scarified and non-scarified grass margins in autumn 2007, and left to establish in 2008. These included common knapweed, ox-eye daisy and red clover.

Assessments in the summers of 2008 and 2010 showed that there was minimal establishment of the 10 sown plants. However, there was significantly greater variety in margins that had been scarified at the time of sowing, than those left unscarified. The scarified margins also had more bare ground and lower mean vegetation height. This gives a more heterogeneous sward, which increases the potential value of the margins as foraging areas for birds.
Bumblebee feeding on meadow cranesbill at Hope Farm
The skylark is one of the most iconic birds of farmland, its song having inspired music and poetry. Unfortunately, skylarks in the UK have declined by over 50% compared to the 1970s, an estimated loss of more than a million birds.

RSPB research showed that skylarks nesting within autumn-sown cereal crops had a shorter breeding season compared with those in spring-sown crops. Skylarks prefer to forage in vegetation below 25 cm and to nest in vegetation shorter than 50 cm. Autumn sowing promotes earlier, more vigorous growth, making most winter cereal crops unsuitable for foraging by skylarks by early May, and unsuitable for nesting by the end of May. However, autumn sowing of cereals is much more profitable; a reversion to spring sowing is not financially viable for many farmers, meaning that other solutions are required for the recovery of the skylark.

As the vegetation structure of autumn-sown cereals appears to affect skylark usage, solutions involving the manipulation of sward structure were tested. In 2001, we began a pilot study, providing 4 m x 4 m undrilled patches in autumn-sown wheat fields, achieved by switching off the seed drill during crop establishment. It was hoped that these bare areas – skylark plots – would enable skylarks to use the crop for both nesting and foraging. Encouraged by positive results at Hope Farm, we joined a research consortium – Sustainable Arable Farming For an Improved Environment (SAFFIE) – farming project to monitor their success on 35 farms across the UK, in 2002–2006. Plots were created at a density of two per hectare.

Results showed that nests in fields containing skylark plots raised more chicks per breeding attempt than in conventional

![FIGURE 5: SKYLARK CHICKS FLEDGED FROM NESTS IN FIELDS WITH AND WITHOUT SKYLARK PLOTS, DURING THE BREEDING SEASON AND LATE SEASON (JUNE ONWARDS).]
wheat fields, with increased fledging success, particularly later in the season (see Figure 5 on page 26). Fields with plots also produced nestlings with better body condition. The number of chicks raised in wheat fields with skylark plots increased by 50%, compared to conventional fields.

The SAFFIE study also investigated the predation of skylark nests in relation to location of field margins. It showed that nests closer to boundaries suffered higher rates of predation. Fields with a combination of 6 m grass margins and skylark plots had the highest levels of predation, which peaked within 50 m of these margins. We therefore recommended that skylark plots be placed at least 50 m from the edge of fields. The skylark plots at Hope Farm have been so successful, we have increased the population from 10 pairs in 2000 to 43 pairs in 2011.

Skylark plots have been adopted within Environmental Stewardship in England, although take-up has been very low. To increase the appeal to farmers, plots can now be created within ELS by spraying off vegetation rather than creating them during drilling. It is hoped that this will increase uptake in the future: a greater number of skylark plots in the countryside will have a positive effect on skylark numbers.

Trials carried out at Hope Farm have examined the differences between undrilled plots, established at sowing, and plots created by subsequent spraying. The timing of spraying was also investigated.

All plots in the trial were sparse enough to allow access for skylarks, and sprayed plots had considerably less cover than undrilled plots. Spraying plots in December allowed more plant colonisation than spraying later. Therefore, later spraying does not provide enough vegetation used by insects that provide skylark nestling food.

Overall, we found that spraying plots by the end of December created the habitat most similar to undrilled plots.
TOWARDS SUSTAINABLE FARMING

The pillars on which Hope Farm was founded were to remain a commercially viable, conventional arable farm, while successfully integrating targeted management for wildlife.

We believe that we have achieved this, increasing biodiversity whilst continuing to grow high yielding and good quality crops. Our clearest evidence of this is the greatly increased number of farmland birds around the farm in recent years and the good tonnage of harvested crops.

In January 2011, the UK Government published a report on the Future of Food and Farming, setting out the challenges facing the global food system up to 2050. One point made in this report is that, globally, more food will be needed in the future but there will be little new land available for farming.

This means we will need to produce more food from the land we’ve got and we will need to do this without compromising the land’s ability to produce food in the future, hence the concept of “sustainable intensification.”

Sustainable intensification is being used by some to justify intensification by all farming sectors across the UK. However, sustainable intensification means different things in different areas and different sectors. For example, some low-intensity farming systems support unique wildlife and provide other vital services such as carbon storage and water quality – intensifying such systems would not be sustainable because it would jeopardise delivery of these other essential public services. In some places, where there are fragile soils for example, we might need to farm less intensively in order to achieve sustainable land management.

Increasing food production must not come at the cost of loss of biodiversity, or other vital ecosystem services that are central to future food security.

The RSPB recognises that there are significant challenges ahead, but we believe that discussions must be based on evidence and a clear understanding that simply increasing production will not in itself achieve global food security.

Hope Farm offers an excellent example of how targeted management for biodiversity can sit alongside highly productive arable farming.

Sustainable intensification goes beyond direct impacts on biodiversity: it includes aspects of farming that have impacts beyond the farm, such as greenhouse gas emissions and agricultural pollutants. In taking reasonable steps to minimise these, every farmer could move towards more sustainable farming systems that deliver across a range of key targets, not just food production.

This is a challenge that we have set ourselves at Hope Farm.
FUTURE CHALLENGES

During the first 12 years, we have achieved most of our core objectives for Hope Farm, showing that increasing farmland bird populations can be achieved whilst running a profitable, conventional arable farm. The results have far exceeded our expectations, but with the UK Farmland Bird Indicator still declining, it’s clear that this success is not being reflected nationally.

In the future, there are likely to be significant challenges for agriculture, with higher commodity prices, climate change, food security and other policy drivers all likely to impact on arable farming.

To retain our relevance and continue to work towards our core objectives, our future work at Hope Farm will incorporate four themes.

MAXIMISING BIODIVERSITY
We aim to keep the Hope Farm breeding bird index at least 120% greater than the baseline in 2000. The farm will also continue to trial new research designed to maximise the benefits for biodiversity, especially with respect to farmland birds.

PROFITABILITY
We will continue to grow good quality and high-yielding crops, seeking consistently to deliver wheat yields above the UK average, giving equal weight between environmental and economic returns in our day-to-day management decisions.

REDUCING GREENHOUSE GAS EMISSIONS
We aim to reduce the farm’s total greenhouse gas emissions by 15% within the next five years.

DIFFUSE POLLUTION
We aim to establish a robust baseline monitoring programme to monitor agricultural pollutants on the farm, allowing us to set targets to begin reducing this pollution within the next five years.
Diffuse pollution is the loss of pollutants from wide areas of land to water. Agriculture is a major source of diffuse pollution from nutrients (mainly nitrogen and phosphorus), pesticides and silt. High levels of nutrients in water cause excessive plant growth, which can starve water of oxygen and kill animal life. It has been estimated that the cost of cleaning up diffuse pollution from agriculture is in excess of £400 million annually, the cost of which is ultimately paid for by the public, through water bills.

New European legislation such as the Water Framework Directive sets challenging targets for the reduction in diffuse pollution from farming. Failure to meet these targets will rightly result in increased restrictions.

At Hope Farm, we are attempting to address the problem of diffuse pollution in several ways. Firstly, the farm uses best practice farming techniques, applying pesticides and fertiliser accurately and in suitable weather conditions; sowing grass margin buffer strips along watercourses to reduce soil run-off and erosion; and sowing overwinter cover crops to reduce nitrate leaching from bare soil.

Secondly, we are trying to identify ways in which pollution entering ditches and watercourses can be cleaned up before the water leaves the farm. We have created several large ponds to test their ability to clean fertilisers and pesticides from watercourses. By creating these features, and monitoring their effect, we aim to help farmers and wildlife face future challenges. We anticipate planting reeds in ponds will increase our ability to remove excess nitrates in the water, whilst any phosphate will have the opportunity to settle within the feature rather than leaving the farm.

These small ponds have already demonstrated that they are invaluable to wildlife within a well-drained, arid agricultural landscape. Retaining wet ground during the breeding season helps keep earthworms closer to the surface, more accessible to birds like song thrushes. Water also attracts insects, which are a good source of food for young lapwings, yellow wagtails and reed buntings.

A study by the Pond Conservation Trust examined the ecological quality of the Hope Farm ponds two years after their creation. It suggested that the ponds were in good ecological condition, particularly in terms of their invertebrates. The report recorded 27 invertebrate families including dragonflies, mayflies, caddisflies, water beetles, flatworms, leeches and water snails, as well as 11 species of aquatic plants. A confounding factor to this ecological development was the drought conditions in 2010 and 2011, when all the wet features dried out. We intend to survey the features regularly to assess how the ponds have developed, and particularly whether the ecological quality has increased or declined with age.
Keeping average global temperature rises to less than 2°C will require a significant reduction in greenhouse gas emissions, such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O).

The UK Government has signed up to achieving 80% reductions by 2050 and, according to the Department for the Environment, Food and Rural Affairs (DEFRA), agriculture is estimated to contribute approximately 8% of the UK’s total greenhouse gas (GHG) emissions. Of this, only about 10% is CO₂, with far larger contributions from CH₄ and N₂O.

In the UK, about 39% of the total methane emissions, 67% of N₂O emissions and 1% of CO₂ emissions are produced by farming. Nitrous oxide is a more efficient absorber of infrared radiation and its global warming potential is 310 times greater than CO₂. It is released from the production and use of fertiliser (including from muck-spreading) and soil disturbance. Methane is 21 times more potent than CO₂ and is released by natural livestock emissions and manure. Carbon dioxide is released by burning fossil fuels (for example, fuel in tractors, farm vehicles, machinery and the production of agricultural chemicals and cultivations). In addition, CO₂ can be either absorbed by or released from soils, depending on land management practices.

One of the challenges for the farming industry will be adapting businesses to an altered climate. Predicted changes in the UK include warmer summers, wetter winters and more extreme weather events and unseasonable weather patterns.

Crop yields may be affected by changes to temperatures, rainfall, CO₂ concentrations in the atmosphere and more extreme and variable weather. There may be an increased risk of new crop diseases and some pests may become more serious. Some changes may also bring benefits and business opportunities, such as longer growing seasons, possible increases in growth rates and yields and the opportunity to grow new crops.
HOW FARMING CAN RESPOND TO CLIMATE CHANGE

Mitigation of climate change involves the adoption of practices that will either reduce emissions of greenhouse gases (GHG) to the atmosphere and/or remove GHGs from the atmosphere into long-term stores. There is considerable uncertainty about the estimates of emissions from the agricultural sector because they are heavily influenced by variables such as climate, soil quality and management practices.

A large number of measures have been proposed as having the potential to reduce emissions from agriculture. However, as well as low-carbon food production, agriculture has a critical role in achieving objectives including the protection and enhancement of wildlife and other natural resources, and the ecosystem services that they provide for society. It is therefore imperative to take an integrated approach to sustainable climate change mitigation, which takes account of these multiple objectives. This will allow perverse outcomes to be avoided (for example, where a mitigation measure reduces carbon emissions but increases other types of pollution) and will ensure the potential for synergies – the “win-wins” – are fully exploited.

Arable farmers can help mitigate climate change by implementing measures such as:

- improved nutrient management to match application of fertilisers to crop nutrient requirements, at all times. Regular testing of the soil nutrient status on a farm,

- reduced or no tillage. While there is some uncertainty over the impact on soil carbon, there are emissions benefits associated with a reduction in ploughing, and positive impacts on soil quality and soil biodiversity.

It is also critical that agriculture adapts sustainably to climate change. Action will be needed to help wildlife survive climate change by building a resilient network of habitats within the landscape, for example, through the use of agri-environment measures.
To assess the carbon footprint of Hope Farm, and options for reducing it while maintaining food production, the RSPB commissioned the University of East Anglia (UEA) and Lawrence Gould, a specialist farm business company, to carry out a study of our footprint for the 2007 harvest.

The first part of the report assessed several industry approaches for estimating the farm’s greenhouse gas footprint:

1) A farm boundary based estimate, similar to the approach adopted by the CLA (Country Land and Business Association) CALM (Carbon Accounting for Land Managers) tool approach.
2) A crop-specific based estimate, assessing the footprint per tonne of wheat, oilseed rape and field beans.
3) A carbon profile estimate. In this approach the manufacture and transport of the fertiliser inputs are added to the farm boundary estimate. This allows a more transparent breakdown of the farm’s whole operations.

Some of the study results include:

- The CALM based approach produced an estimate, for the total net GHG emissions, of 155 tonnes of carbon dioxide equivalent (tCO₂e) for 2007.
- Crop-specific based estimates – GHG estimates per tonne of crop were higher for oilseed rape than winter
wheat, with our spring beans producing the lowest estimate.

- Carbon profile approach – net GHG emissions for harvest 2007 were estimated as 274 tCO₂e. This figure is the net of emissions from the farm profile, including: farm operations, crop drying, fertiliser and agrochemical inputs, transport and carbon sequestered (or captured within the soil) by conservation strips, new grass buffer strips, and existing mapped woodland (assumed to have been planted some time after 1950).

- The report highlighted significant uncertainties in nitrous oxide (N₂O) emissions using the IPCC Tier 1 methodology. The rate at which nitrous oxide is emitted by soils depends on the interaction of many factors including carbon content and nitrogen availability; bulk soil density; soil pH; rainfall and temperature.

- The greatest sequestration impact is from woodland creation, although true net sequestration is not known due to lack of data on soil organic carbon prior to planting (this has been estimated to be the same as currently in arable fields).

- More thorough measurement and complex modelling is required to estimate the organic carbon storage capacity of Hope Farm soils, and the permanence of soil sequestration from conservation plantings (such as wild bird mix), incorporation of crop residues, etc.

- The more significant reduction in GHG emissions from conservation measures came through removal of land from intensive crop production, in particular the removal of nitrogenous fertiliser related nitrous oxide emissions – and the indirect emissions from its manufacture and transport.

The RSPB will use these report findings to examine how we can adapt our farming operations, with the help of our agricultural contractor, to reduce the GHG footprint of the farm, while maintaining high yields and farmland bird numbers.

Future research will focus on potential carbon sequestration through Environmental Stewardship measures such as permanent grass, floristically enhanced and pollen and nectar margins, and wild bird cover.

Fertiliser spreading at Hope Farm
DEMONSTRATING THE VISION: FARMING AND THE RSPB

Farming is an integral element in land management across a large number of our nature reserves. This crosses many farming sectors: arable, upland livestock, lowland livestock and mixed. Approximately 25,000 ha of RSPB nature reserves are farmed in some way. We also work with more than 4,000 farmers across the UK annually, through our team of agricultural advisers, who offer specific advice on wildlife management and help with Environmental Stewardship applications, and our large network of volunteers who survey birds on farms through the Volunteer & Farmer Alliance.

Several RSPB nature reserves have large farming enterprises, run commercially. Some of these are highlighted below.

**MANOR FARM, WILTSHIRE**
Manor Farm is the operational base of the Winterbourne Downs reserve, where RSPB staff, equipment and livestock are busy creating a landscape-scale area of chalk grassland to provide a safe haven for stone-curlews on permanent semi-natural habitat. Here, 162 ha of arable land has been reverted to chalk grassland. To manage these less productive grasslands, ewe lambs are brought in each autumn and sold the following year as shearlings. The breeding ewe flock of north country mule ewes is being replaced by Romney Marsh ewes. Cattle are brought in under lease for late summer grazing and stepping stones of arable have been kept to maintain a variety of farmland birds. The arable rotation comprises autumn-sown wheat, stubble turnips, spring barley and oilseed rape. This is bolstered by fallow plots for ground-nesting birds, wild birdseed mixture plots, uncropped cultivated margins for rare arable plants, grass and nectar flower margins, field corner management, skylark plots and over-winter stubbles.

**TARNHOUSE FARM, CUMBRIA**
Tarnhouse Farm is a working organic farm of 2,041 ha that covers around half of the RSPB Geltsdale reserve. It is a mosaic of upland heath and blanket bog habitats, with smaller amounts of acid grassland, hay meadow, woodland and arable land. The farm is run by a tenant farmer, John Errington, with his daughter Beth. The principal activity is grazing, with meadows managed for haylage. The majority of the farm is in Uplands Organic Entry Level Stewardship and Higher Level Stewardship. There are currently 60 Blue-Grey and 32 Aberdeen Angus breeding suckler cows in five separate herds. All cattle are spring calving in April/May, and most stores are sold privately in autumn to organic finishers – 25 are kept for grazing the hill the following year. Around 500 Scottish Blackface sheep graze the open hill in three hefts. The sheep are sold mostly as stores at around 30–35 kg and a small number of ewes with followers are sold in spring. Grazing levels are carefully maintained to benefit birds such as black grouse, lapwings and curlews.

**OUSE WASHES, CAMBRIDGESHIRE**
The Ouse Washes is the largest example of lowland wet grassland in the UK and has been farmed extensively and virtually unchanged since its creation when the Fens were drained 350 years ago. The complete area of the Ouse Washes, including the surrounding river banks, is 2,200 ha, of which the RSPB manages 1,200 ha. The rest is managed by other conservation bodies and private ownership. As land managers, we work closely with 33 local farmers who provide upward of 2,500 head of beef cattle to graze the washes during the summer months. The majority of the cattle are commercial breeds: Charolais, Limousin, Blonde d’Aquitaine and Simmental being typical examples. Seventy per cent are suckler cows with calves, the rest being 2nd year stores, growing on. Whilst grazing on the Washes the cattle are managed by a dedicated stock team, who carry out daily...
shepherding duties, treatments and preventive worming programmes.

Due to the unique grazing system that the Ouse Washes offers, a beef marketing business set up in 2009 currently delivers 30 bodies of beef a month to butchers in the Eastern region. For more information, visit www.riversidebeef.co.uk

TYLLWYD FARM, VYRNWY, POWYS
Tyllwyd farm is at the southern end of the Berwín Mountains, and covers 4,654 ha. The farm extends from 250 m above sea level, on lakeside pasture, up to 666 m on heather moorland. Organic conversion with the Organic Farmers and Growers was completed in August 2001. The farm is predominately upland heather, with grass fields on the lower slopes around the reservoir, and some arable cropping. Due to the shortage of lowland grassland, the livestock at Vyrnwy are managed in conjunction with other field groups at Shrewsbury and Newtown, and wintered at Newport, South Wales, for replacement lambs. By using the off-lying areas in conjunction with a new sheep shed, it has been possible to reduce the environmental damage caused by winter grazing on heather, while improving the condition and productivity of the stock. The breeding flock comprises 3,150 Welsh Mountain ewes, 1,050 ewe lambs, 70 rams and 100 wethers, and runs as six separate hefted flocks. Some 600 sheep are crossed with Charollais, Cheviot and Texel to produce fat lambs. There are 35 Welsh Black Cattle and 10 heifers are bulled every year. The fat lambs and calves and cattle are sold through Dolgellau Market. Lambs, wethers and cattle are also used for meat sales in the on-site shop and with home delivery to customers within 30 miles.

AORADH, ISLAY
Aoradh, on the Isle of Islay, Argyll, was the Society’s first venture into actively farming land. There, on 700 ha of grazing land and 20 ha of spring arable, we run an intensive, low ground, suckler herd of 200 beef cows and a flock of 200 Cheviot ewes. Farming is in-hand due to the complexity of the site and the conservation management required. The farm has to be commercially viable, providing a demonstration site relevant to other commercial farmers on and off the island and from which we can take on an advisory role. The herd is closed, as we breed our own replacement cows, with only bulls bought in. The breeds used are Charolais, Limousin and Angus – the cows produced by crossing back and forward between the latter two. Calves from the herd regularly sell in the top 10% of price per kilo and we have taken a range of prizes over the years, including a recent best in show at the Scottish Winter Fair. Sheep are bred as pure Cheviot and, with a lambing percentage of more than 160, also perform at the top end of type.
A large number of RSPB staff and volunteers, experts in wildlife and people from across the farming industry have made significant contributions to the success of Hope Farm.

We wish to thank all who have contributed to this success. In particular, we would like to thank Mark Avery, former Conservation Director for the RSPB (1998–2011), for having the drive and enthusiasm to ensure that the concept of Hope Farm became a reality, and George Topham & Son for their expertise in cropping.

Particular tribute should be paid to past, and current, RSPB staff who have worked at Hope Farm:

**Farm Managers**

Roger Buisson 1999 – 2004
Darren Moorcroft 2004 – 2006
Chris Bailey 2006 – 2011
Ian Dillon 2011 – present

**Senior Research Assistants**

Will Kirby 2000 – 2004
Chris Bailey 2004 – 2006
Ian Dillon 2006 – 2009
Graham Uney 2009
Derek Gruar 2009 – present

**Research Assistants**

Chris Bailey, Susanna Clerici, Allan Goddard, Michal Maniakowski, Peter West and David Wright

We have also greatly benefited from the advice of the Farm Advisory Group, whose expertise has helped to steer the work of Hope Farm.

**Farm Advisory Group – external members (2000–2010)**

Nigel Boatman, James Clarke, James Goodhart, Ian Newton, John Osmond, David Sheldon, George Topham, and Chris Whittles.

**Farm Advisory Group – internal members (2000–2010)**

Mark Avery, Sue Armstrong-Brown, Richard Bradbury, Tony Morris, Andy Evans and Richard W inspear.
Research is one of the core activities at Hope Farm. This involves trialling novel techniques for the benefit of birds and other wildlife. Often these trials are at a very early stage in the development process. Hope Farm regularly hosts trials before they are rolled out across a wider number of farms for more rigorous scientific assessment. For many of the trials the results are best taken as indicative, but our research department, Conservation Science, strives to publish as much of our research as possible in peer-reviewed journals. The list below features published papers that were either wholly based on Hope Farm research, or that include data gathered at Hope Farm.


WOULD YOU LIKE TO BE PART OF HOPE FARM?

Help us continue our vital work on the farm by becoming a Hope Farm Supporter. By giving a regular gift you will help us continue testing the introduction of new wildlife-friendly farming techniques.

As a Hope Farm supporter, you’ll be invited to visit the farm to see for yourself how your support is helping our work and benefitting wildlife. You’ll also receive our Impact newsletter, to keep you updated about RSPB conservation projects, including Hope Farm.

If you would like to support our work in this way, please contact the Membership Services team at The Lodge on 01767 693680.

If you would like to visit Hope Farm to see our work in action, or have any questions regarding the farm, please contact the Farm Manager at Grange Farm, Knapwell, Cambridgeshire, CB23 4NR or telephone 01954 267438.

For more information, visit www.rspb.org.uk/farming

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