



## Trends of Breeding Farmland Birds in Scotland

Prepared using evidence from the Breeding Bird Survey (BTO/JNCC/RSPB)

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### Introduction

Farming is a critical activity for Scotland and has shaped many of the landscapes we see today (Hall, 2011). Farming supports a range of wildlife. However, as farming practices have evolved to improve levels of production we have seen more intensive farming. The rate of intensification increased following the Second World War up to the 1980s (Mackey, *et al.*, 1998). This has resulted in reduced availability of suitable habitats for wildlife including birds, butterflies and bees. Over the past twenty years various measures have been put in place to try to help farmland wildlife, including specialised plantings of wildlife-friendly habitats (e.g. beetle banks, game cover crops and wildlife corridors). For birds these areas can prove very beneficial; and targeted management schemes have also assisted the recoveries of some species, such as corncrake (O'Brien *et al.*, 2006) and corn bunting (Perkins *et al.*, 2011). However, not all farmland birds have increased in numbers and some, such as lapwing, continue to decline. Often it is difficult to pick out one main reason for a species declining; changes to farming practices may be just one factor. Many of our breeding birds are migratory or move away from farmland in the winter months, so changes in the wintering areas may also produce effects noticeable in Scotland's farmland breeding birds. Climate change may also be an important driver for some of our bird populations, though for farmland birds this may be more due to the changes in land use. This trend note assesses the evidence for changes in abundance of Scotland's farmland birds and discusses the potential reasons for the changes.

### Key Points:

- **Estimates of trends in abundance are presented at national and 100km square scale for ten species of birds that are strongly associated with farmland.**
- **Four of the five wader species assessed (curlew, lapwing, oystercatcher and redshank) show significant declines, with only snipe showing an increase.**
- **The farmland seed-eaters all show stable (skylark, yellowhammer) or increasing (linnet and tree sparrow) long-term trends. In the short term, only skylark has a decreasing trend.**
- **Targeted management at an appropriate scale can benefit farmland birds. Past declines in corn bunting have been reversed, reflecting the success of targeted management for this species.**

### Methods

The data used are collected by the BTO/JNCC/RSPB Breeding Bird Survey (BBS). The BBS is conducted at a random sample of 1km squares across the UK, visited by volunteers on two morning visits each year in late spring and early summer. The same squares are visited each year and new squares are added as new volunteers are recruited. We analysed the data collected in Scotland from c.600 squares between 1994 and 2011 and looked at trends in relative abundance (relative to 1994) for ten Scottish bird species – *farmland waders* (curlew, lapwing, oystercatcher, redshank and snipe), *seed eaters* (linnet, skylark, tree sparrow and yellowhammer), and corn bunting. The species were assessed separately

and in combination for the two species communities (farmland waders and seed-eating birds).

Our modelling approach builds on the methods used previously for assessing UK-wide temporal trends in biodiversity (Studený *et al.*, 2013). For each species we fitted empirical spatio-temporal models using statistical smoothing techniques applied to the survey data. These account for the survey year, the location of the site, the mean elevation and the percentage of different land cover categories at the site (based on the 2007 Centre for Ecology and Hydrology (CEH) land cover map). The models allow us to predict the abundance of all widespread species of breeding bird for both surveyed and unsurveyed 1km grid squares for each survey year. These results can be presented at different scales such as political regions, countries or gridded areas (we use 100km Ordnance Survey grids in this report), and can explore how trends vary through time across different locations.

### The species accounts: Interpreting the trends

We have produced a simple key for interpreting the trends. The solid lines show the trends, and the dotted lines show 99% confidence intervals on the change since 1994. Five classes of change points are highlighted with different colours (see Trend Key) based on significance at the 1% level. If there are no coloured points marked on the graphs, this means we could not find a statistically significant relationship in the trend at any individual time point. The graphs show changes in abundance relative to 1994 and trends are plotted on the natural logarithmic scale. We present results for 100km squares in Scotland, for all of Scotland and, for comparison, England and Wales combined.

#### Trend Key

dark green –	increasing/improving;
pale green –	moving towards increasing/improving;
none –	no evidence of change;
amber –	moving towards decreasing/deteriorating;
pale red –	decreasing but rate slowing down;
dark red –	decreasing/deteriorating.



Tree sparrow © SNH Images

Our ability to estimate a trend for a given square, and consequently whether we present trend information, depends on the amount of data that we have. The analysis is restricted to mainland Scotland, Islay, Jura, Mull and Skye, as sampling effort by the BBS on the other Scottish islands is low and their isolation from the mainland is problematic from a modelling perspective. For the community level analyses we look at trends in the geometric mean of relative abundance (Buckland *et al.*, 2011) for the species belonging to each community (seed eaters and farmland waders). We refer to this as “mean relative abundance” in the figures. As a headline indicator of temporal trends in biodiversity the geometric mean of relative abundance has been readily adopted elsewhere (such as for the Living Planet Index<sup>1</sup> and the UK’s Wild Bird Indicator<sup>2</sup>).

Each species account contains: a short summary of the trend in relative abundance based on our analysis. Long-term is the trend for the whole time series (1994-2011); short-term is the trend from 2006-2011. The latest population estimate for Scotland is usually from *The Birds of Scotland* (Forrester *et al.*, 2007); conservation status from *Birds of Conservation Concern 3* (BoCC3) (Eaton *et al.*, 2009); and from the International Union for Conservation of Nature (IUCN) Red List of Threatened Species<sup>3</sup> where LC = Least Concern and NT = Near Threatened.

<sup>1</sup> [http://wwf.panda.org/about\\_our\\_earth/all\\_publications/living\\_planet\\_report/](http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/)

<sup>2</sup> <https://www.gov.uk/government/publications/wild-bird-populations-in-the-uk>

<sup>3</sup> <http://www.iucnredlist.org/>

## The Scottish Rural Development Programme

We present trend information on a selection of bird species that are listed as Seed-eating Birds<sup>4</sup>, Farmland Waders<sup>5</sup> and Corn Bunting<sup>6</sup> Priority Species in the Scottish Rural Development Programme (SRDP). Two additional species are listed as Seed-eating Bird Priority Species (reed bunting and twite) but there were not enough records to assess their trends.

**NOTE – Although we present trends for SRDP Priority Species a causal link between the trend and the SRDP measures cannot be made.**



Arable farmland with wildflowers ©SNH Images

### What has happened to farmland birds in the past?

Advances in technology – from the advent of tractors to the widespread application of nitrogen-based fertilisers, pesticides and herbicides and new disease resistant crops – mean that we now produce more on our farmland than ever before. This has had some drawbacks for farmland wildlife including birds. Intensification increased the production levels but also made the land less suitable for many forms of wildlife (Krebs *et al.*, 1999). For many farmland birds, the main declines were in the 1970s and 80s (Siriwardena *et al.*, 1998), with losses of hedges, wet areas and other crucial features for farmland birds, as a result of E.U. Common Market funding for intensifying agricultural production. This decline can be clearly related to agricultural intensification (Chamberlain *et al.*, 2000).

The damaging effects of agricultural pesticides became clear during the 1950s and 1960s (Wilson, 2011). This was largely through the disastrous impacts of persistent pesticides such as DDT, aldrin and dieldrin (Carson, 1963). There are now more rigorous procedures for controlling the use of pesticides, and the effects of these on wildlife are monitored in the UK through schemes such as the Predatory Bird Monitoring Scheme<sup>7</sup> which keeps a watch for any emerging threats to wildlife. To date, there has been little detectable impact of climate change on farmland bird populations in the UK (Eglington and Pearce-Higgins, 2012).

There is a lack of reliable historical trend data for Scotland's farmland birds (Wilson, 2011). From studies that do show trends, declines have been observed from the 1970s for a range of farmland birds (Benton *et al.*, 2002) and for individual species such as corncrake (Green and Stowe, 1993) and corn bunting (Wilson *et al.*, 2007). Noble *et al.* (2007) showed that a suite of farmland birds in Scotland, which included lapwing, tree sparrow and yellowhammer, declined in range from 1970 to 1990 by 8%.

<sup>4</sup> <http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds>

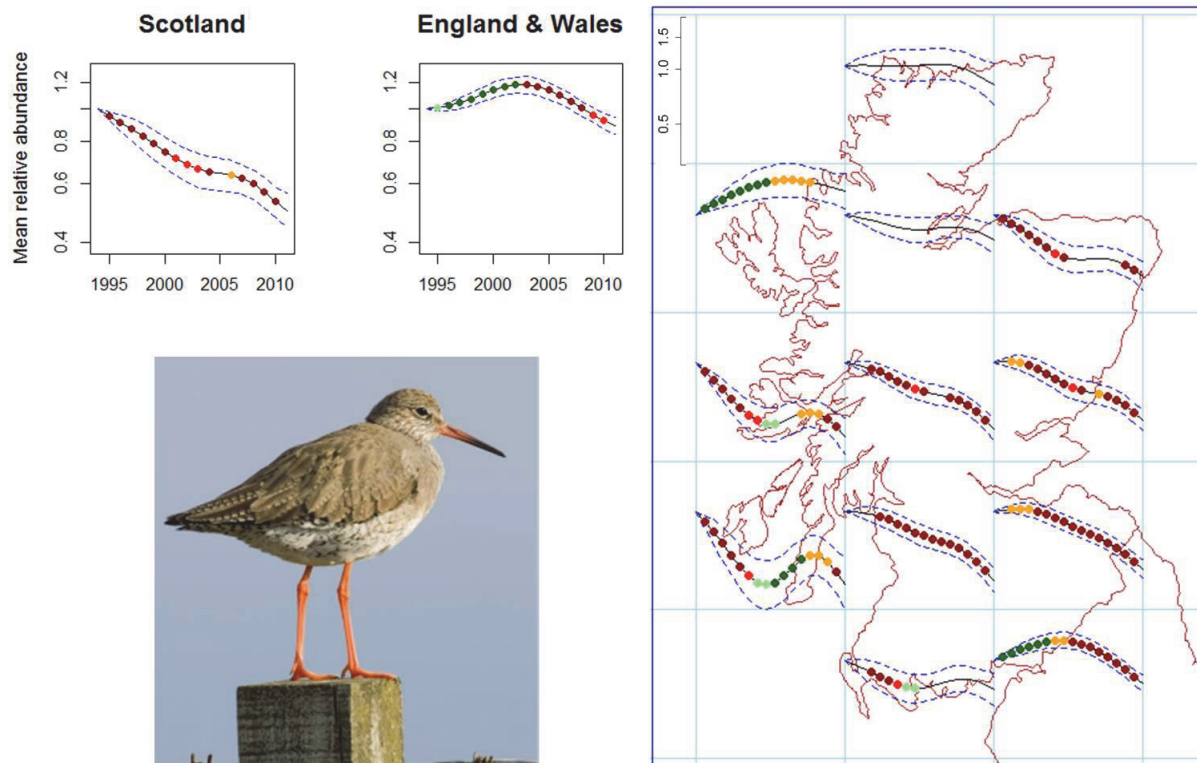
<sup>5</sup> <http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders>

<sup>6</sup> <http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/CornBuntings>

<sup>7</sup> <https://wiki.ceh.ac.uk/display/pbms/Home>

## Combined farmland waders trend (curlew, lapwing, oystercatcher, redshank, snipe)

The overall trend in Scotland for breeding farmland waders is one of steep decline. Similar declines are now occurring in England and Wales, although they began later.



Regionally, the onset of decline has varied. Several areas in the south and west of Scotland have shown some previous increases, and one in the south west shows a stable trend.

Farmland waders require a range of land management techniques for creating the habitats needed for successful breeding. Different waders need different habitats; for example lapwing require recently ploughed land and redshank need wet areas and wet ditches. These were common, widespread features on most farmland across Scotland. These features have declined partly as a result of improved techniques for drainage and land management and changes to cropping regimes. So now there are fewer areas capable of supporting breeding waders. The changes may be partly driven by the funding mechanisms available to farmers. These can help shape the land, but they may also work against one another, for instance the desire to increase the area of woodland in Scotland has led to the planting of trees in poorer areas of fields, and sometimes planting in areas which would be better suited to land managed for breeding waders. Predation has also been widely shown to be affecting the breeding success of waders (e.g. Malpas *et al.*, 2013a; Amar *et al.*, 2011; Bolton *et al.*, 2007; Fletcher *et al.*, 2010).

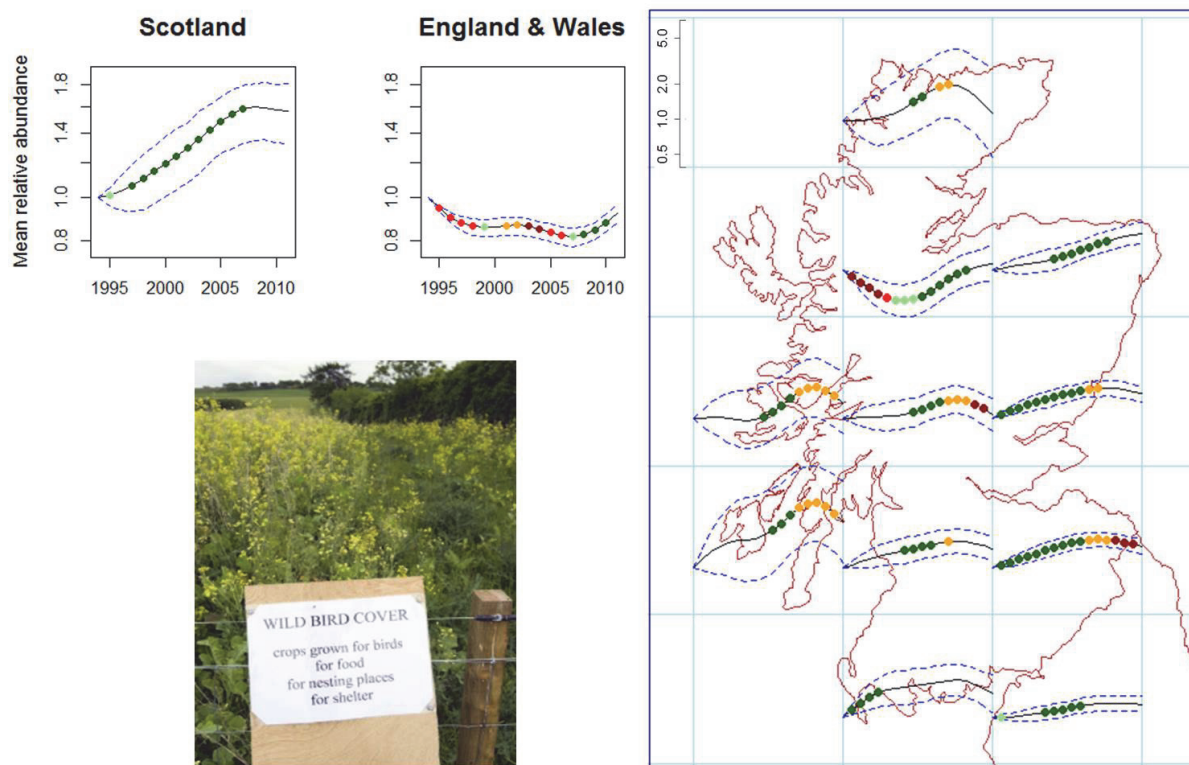
Most studies suggest that breeding waders are not producing enough chicks for a stable population (Peach *et al.*, 1994; Roodbergen *et al.*, 2012). Changes in farming practices and pressures including predators are likely to have contributed to the sustained decline of most breeding waders in Scotland. Pressures such as disturbance and loss of key feeding areas in winter may also be adding further to these declines.

Several studies have looked at ways to improve breeding success for farmland waders (e.g. O'Brien and Wilson, 2011). However, to date none have been rolled out at a sufficiently large scale to allow recoveries for some of these once common birds. More information on the range of management techniques available for farmland waders is available at <http://www.conservationevidence.com/> and the SRDP Farmland Waders Package.<sup>8</sup>

<sup>8</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders)

## Combined seed-eating birds trend (linnet, skylark, tree sparrow, yellowhammer)

The combined trend for four of the seed-eating birds shows an overall increase, although since 2007 the trend has been flat. Since 1994, the trend for England and Wales has been relatively stable.



Across Scotland the trends are mixed, with some periods of increase in all regions being offset by decreases, particularly around central and western areas of Scotland.

Studies have shown that seed-eating birds can benefit from targeted management (e.g. Douglas *et al.*, 2010; Perkins *et al.*, 2011) and maintaining suitable areas for breeding and feeding can assist populations. The provision of game-cover crops; maintaining turnip fields with a good population of suitable seed plants such as fat hen; and managing winter stubble can help with over-winter survival. Providing suitable habitat for breeding birds (e.g. banks of undisturbed gorse, hedgerows and nest boxes) is also vital.

More information on the range of management techniques available for the farmland seed-eaters is available from <http://www.conservationevidence.com/>, the SRDP Seed-eating Birds Package<sup>9</sup> and some of the SRDP management options available to land managers.<sup>10</sup>

## Trends of the farmland birds mentioned in the text at a glance

Species	Scientific name	Long-term trend	Short-term trend	Population	BoCC3	IUCN
Common snipe	<i>Gallinago gallinago</i>	Increase	Increase	34,000-40,000 pairs	Amber	LC
Curlew	<i>Numenius arquata</i>	Decrease	Decrease	58,800 pairs	Amber	NT
Lapwing	<i>Vanellus vanellus</i>	Decrease	Decrease	71,500-105,600 pairs	Red	LC
Oystercatcher	<i>Haematopus ostralegus</i>	Decrease	Decrease (slowing)	84,500-116,500 pairs	Amber	LC
Redshank	<i>Tringa totanus</i>	Decrease	Decrease (slowing)	11,700-17,500 pairs	Amber	LC
Linnet	<i>Carduelis cannabina</i>	Increase	Stable	70-90,000 pairs	Red	LC
Skylark	<i>Alauda arvensis</i>	Stable	Decrease (accelerating)	290,000-557,000 pairs	Red	LC
Tree sparrow	<i>Passer montanus</i>	Increase	Increase	4,600 – 8,100 pairs	Red	LC
Yellowhammer	<i>Emberiza citrinella</i>	Stable	Increase	140,000-220,000 pairs	Red	LC
Corn bunting	<i>Emberiza calandra</i>	Decrease	Increase	c.800-1,000 singing males	Red	LC

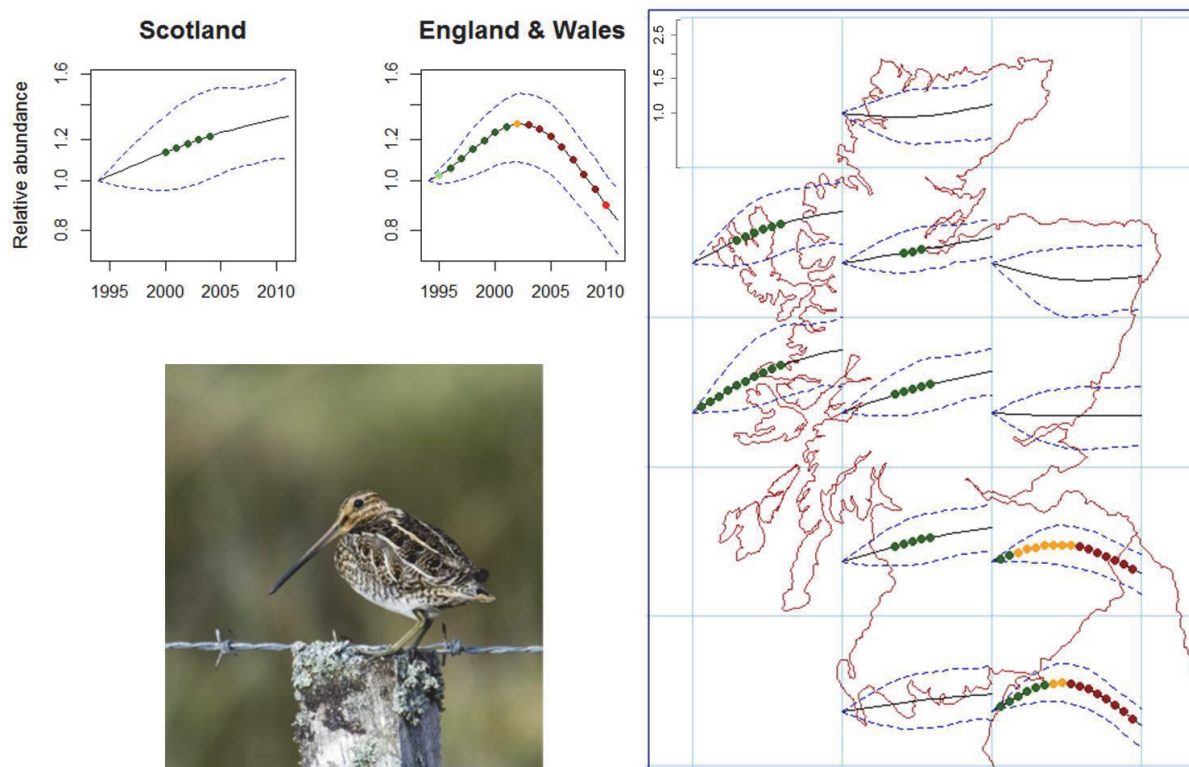
<sup>9</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds)

<sup>10</sup> <http://www.scotland.gov.uk/Topics/farmingrural/SRDP/Land-Managers-Options/Availableoptions>

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Increase	Increase	34,000-40,000 pairs	Amber	LC

## Common Snipe

Common snipe are a widespread breeding wader (O'Brien, 2007). Their familiar drumming call can be heard throughout boggy and wet areas of Scotland, in the uplands and lowlands. The latest trend for Scotland shows a general increase since 1994, in contrast to the recent declines observed in England and Wales.



Regionally, trends are variable, with increases noted across northern areas of Scotland. In contrast there is a significant and accelerating decline in the south-east of Scotland.

### *What factors are driving populations?*

Snipe associate strongly with boggy and wet areas (Pearce-Higgins and Grant, 2006), where they forage for subsurface invertebrates, mostly earthworms and crane fly larvae (Hoodless *et al.*, 2007). Drainage of wetlands and farmland intensification are key factors affecting snipe.

### *What is being done?*

Further research is required to understand the factors that affect snipe and determine the population status. The majority of snipe are distributed across boggy areas of Scotland and there is little targeted conservation action for snipe. However projects that will restore wetland areas, such as the LIFE Peatland Restoration project in Caithness and Sutherland,<sup>11</sup> may benefit snipe if suitable marsh areas are restored. Snipe may benefit from the SRDP Farmland Waders Package.<sup>12</sup>

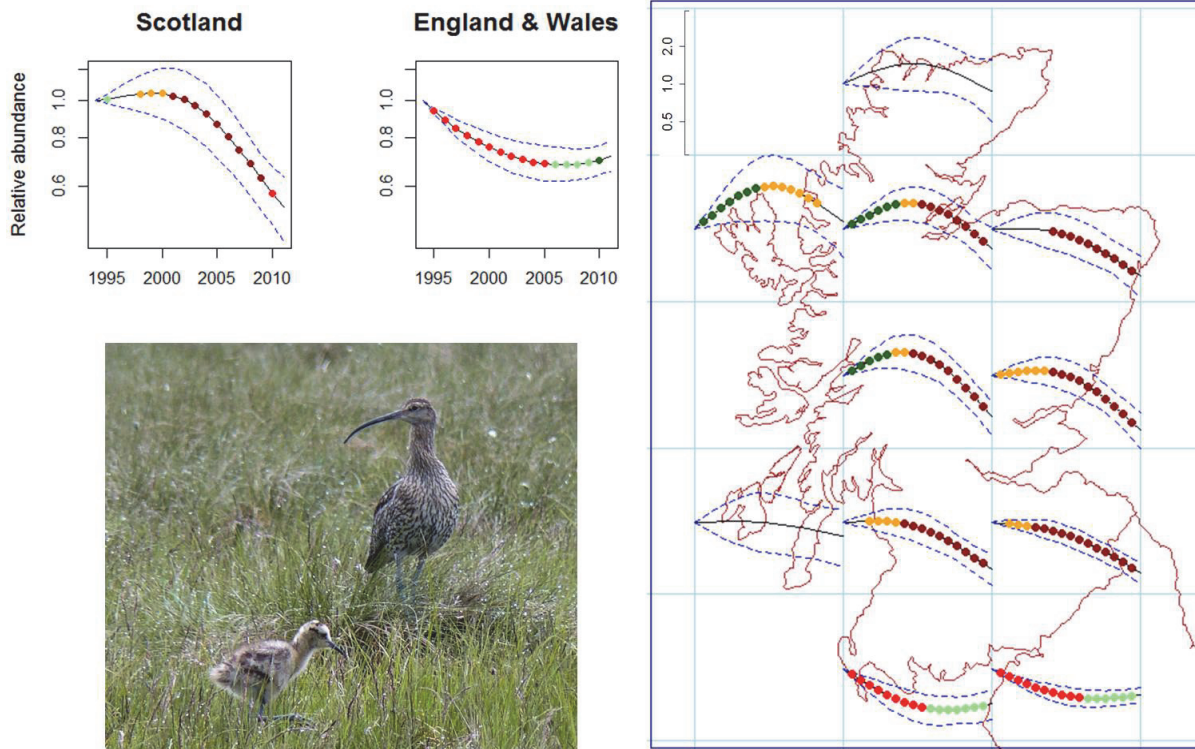
<sup>11</sup> <http://www.lifepeatlandsproject.com/index.php>

<sup>12</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders)

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Decrease	Decrease	58,800 pairs	Amber	NT

## Curlew

Curlews are a widespread breeding wader. They typically breed in farmland and a wide-range of habitats in the uplands (Pearce-Higgins and Grant, 2006). O'Brien (2004) estimated that in Scotland around 45,000 pairs bred in farmland and 13,000 in the uplands. At the national level there has been a decline of 44% from 1995-2010 which has also been reflected across Europe. Just over half of the UK curlews breed in Scotland (see O'Brien, 2004) equating to around 20% of the European population (Thorup, 2006). The IUCN status for curlew has recently been altered to globally Near Threatened in response to these declines (BirdLife International, 2013).



Regionally numbers have shown significant declines in most areas with the exception of northern Scotland and the southern uplands.

### *What factors are driving populations?*

Amar *et al.* (2011) found that population declines were greatest on heather moorland, potentially reflecting a reduction in the quality of this habitat. In Northern Ireland, where declines were examined in detail, low breeding success resulted from high rates of fox predation (Grant *et al.*, 1999). The instigation of predator control was demonstrated to improve curlew breeding success on upland moorland in northern England (Fletcher *et al.*, 2010). Other factors such as afforestation, agricultural intensification and improvement have been proposed as causes of decline (see Sim *et al.*, 2005; BirdLife International, 2013). Curlews breeding in Scotland tend to migrate south or south-west into Ireland (Bainbridge and Minton, 1978; Wernham *et al.*, 2002) and factors in the wintering ground may also be affecting the population.

### *What is being done?*

The decline has only been identified relatively recently and research is needed to fully understand what is driving the population changes. RSPB has begun to explore the reasons for the decline in south Scotland, looking to identify the possible causes of changes in curlew populations and their links with changes in land management in two extensive study areas.<sup>13</sup> Curlews may benefit from the SRDP Farmland Waders Package.<sup>14</sup>

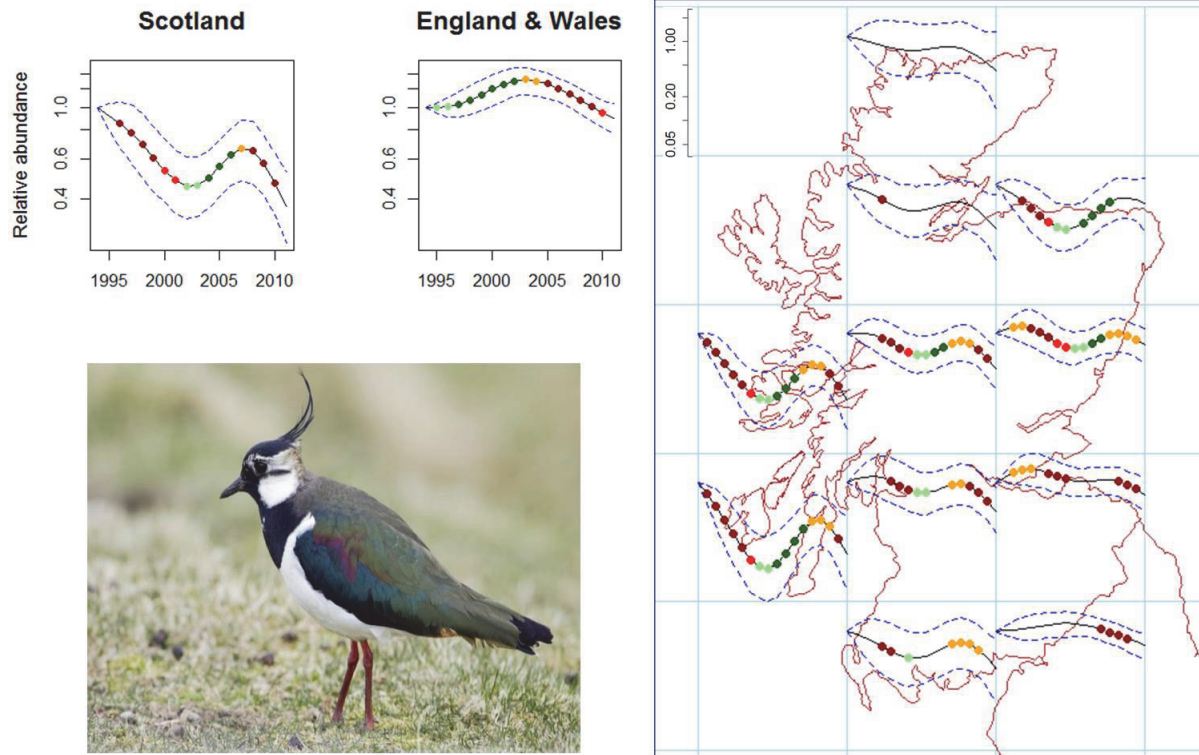
<sup>13</sup> <http://www.rspb.org.uk/ourwork/projects/details/263911-investigating-the-causes-of-curlew-declines->

<sup>14</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders)

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Decrease	Decrease	71,500-105,600 pairs	Red	LC

## Lapwing

Lapwings are a familiar and widespread breeding wader. Their distinctive “peewit” call can be heard through much of Scotland’s farmland in the summer months. In the 19<sup>th</sup> century there was widespread egg collecting for food which caused declines in many areas (Holloway, 1996). There was temporary respite and recovery for lapwings with the advent of the 1926 Lapwing Act which imposed a closed season to egg collecting, however with the advent of modern intensive farming, declines have continued in some areas. The trend for Scotland is a pattern of fluctuating decline.



Regionally the pattern shows similar variations to the national trend, with the decline being most pronounced in the west.

### What factors are driving populations?

Generally the evidence points towards agricultural intensification as the cause of change, in particular drainage and changes to cropping regimes (e.g. Sheldon *et al.*, 2004; Wilson *et al.*, 2009; Wilson *et al.*, 2004). For example, declines in the Scottish Borders were attributable to agricultural improvement and drainage (Taylor and Grant, 2004). Smart *et al.* (2013) showed that the population declines are a result of reduced breeding productivity. Predation may also reduce breeding success leading to population declines. Controlling predators may increase breeding success at some sites (Bolton *et al.*, 2007; Fletcher *et al.*, 2010; Malpas *et al.*, 2013a). Holloway (1996) also suggests that some historical populations may have increased as a result of conversion of moorland and bog to pasture. There are some potential impacts of climate change, such as effects on winter distributions (Gillings *et al.*, 2006) and changes in egg laying dates (Both *et al.*, 2005), but they have probably not driven declines (Chamberlain and Crick, 2003).

### What is being done?

A lot is known about the ecological requirements of lapwing (Sheldon *et al.*, 2004). Wilson *et al.* (2009) provide an accessible summary of the status of lapwing and the various conservation efforts that have been trialled in the past. Eglington *et al.* (2010) showed that providing shallow wet areas improved lapwing breeding success. Lapwings may benefit from the SRDP Farmland Waders Package.<sup>15</sup>

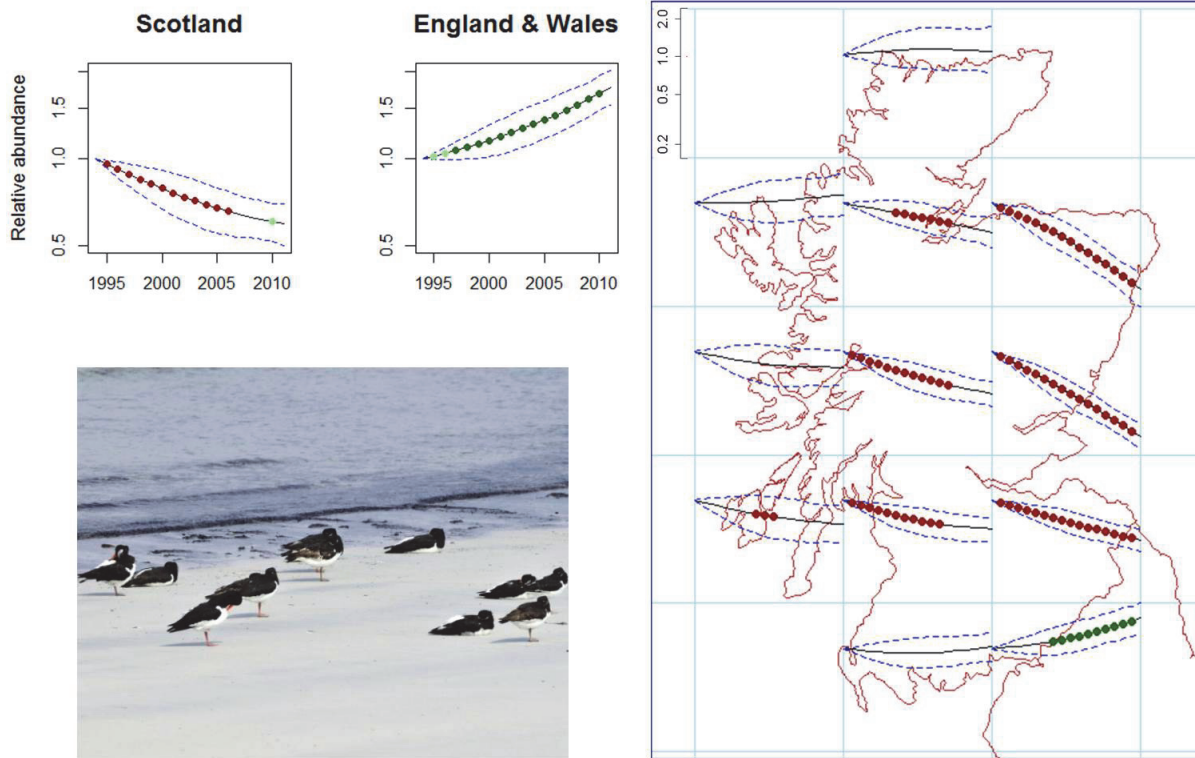
<sup>15</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders)



Long-term trend	Short-term trend	Population	BoCC3	IUCN
Decrease	Decrease (slowing)	84,500-116,500 pairs	Amber	LC

## Oystercatcher

The oystercatcher is one of our most recognisable waders. They can be found throughout Scotland, breeding in a range of habitats. Scotland holds around 90% of the UK breeding birds. Recently there has been a trend for some birds to nest on urban rooftops (Duncan *et al.*, 2001). Oystercatchers differ from many other waders because they feed their chicks. Most other waders do not actively provide food for their young and the young feed themselves when they hatch. Parental provision means that food can be brought in from a considerable distance – this has probably helped their urban increase. Their numbers have risen over the past 200 years (Holloway, 1996). In recent times however, the population has declined, although there is some evidence that this decline has slowed over the past four years.



Regionally there are significant declines in the east, relatively stable trends in the west and a small increase around the borders.

### What factors are driving populations?

Many oystercatchers that breed in Scotland winter in the south west of England (Swann, 1985; Wernham *et al.*, 2002). The factors affecting them may be a result of changes in their breeding areas (e.g. changes to cropping regimes resulting in lower quality breeding habitat) and/or on the wintering grounds. Oystercatchers have been well-studied on their wintering grounds and factors driving populations include over-fishing of cockles and mussels (Atkinson *et al.*, 2010; Blomert *et al.*, 1996; Goss-Custard, 1996); human disturbance (Stillman and Goss-Custard, 2002) and changes to organic pollution (Furness *et al.*, 1986). A study in the Netherlands found that extreme coastal flooding events as a result of climate change reduced the breeding success of oystercatchers (Van de pol *et al.*, 2010).

### What is being done?

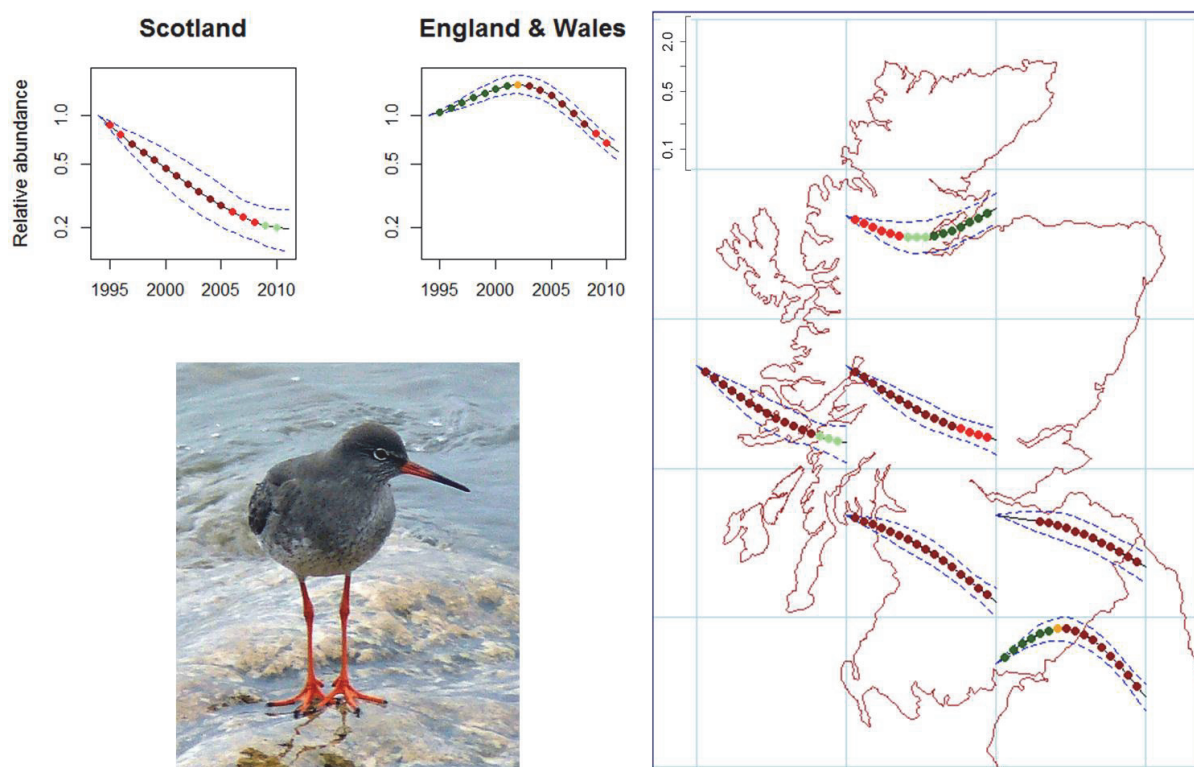
Oystercatchers may benefit from the SRDP Farmland Waders Package.<sup>16</sup> There is also a key requirement to further our knowledge on what is causing the changes in breeding oystercatcher populations throughout Scotland.

<sup>16</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders)

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Decrease	Decrease (slowing)	11,700-17,500 pairs	Amber	LC

## Redshank

Redshanks are a common and widespread wader (Thompson, 2007). They favour damp pasture, rough grassland and saltmarsh for breeding. In the 19<sup>th</sup> century, there was a large expansion in redshank numbers, which remains unexplained (Holloway, 1996). Subsequently the number of breeding birds has declined. The trend for Scotland shows a gradual significant decline, which has slowed in recent years.



Regionally the declines have been greatest in south and west Scotland. It is important to note that due to a lack of BBS data no trend is presented here for the northern and western isles where a considerable proportion of the breeding population is located. This is due to a lack of survey squares.

### *What factors are driving populations?*

The quantity and quality of breeding habitats such as saltmarsh determine the number of breeding redshank. Previous studies have shown that redshank breeding on saltmarsh areas require some form of grazing management (Malpas *et al.*, 2013b; Norris *et al.*, 1998). The lack of grazing at an appropriate level, too low or too high, creates an unsuitable breeding area. Smart *et al.* (2006) found that redshank breeding densities were influenced by the presence of shallow wet features and the length of pool edges. Other factors highlighted as affecting breeding redshank include agricultural intensification and land drainage (Snow and Perrins, 1998). Coastal breeding redshank can be affected by climate change; van der Pol *et al.* (2010) showed that redshank were susceptible to extreme flooding events in the Netherlands.

### *What is being done?*

Breeding redshanks are being supported in a range of ways, through projects such as the managed re-alignment at Nigg Bay<sup>17</sup> and various management plans (e.g. Strathspey Wetlands and Waders Initiative<sup>18</sup>). Redshank may benefit from the SRDP Farmland Waders Package.<sup>19</sup>

<sup>17</sup> <http://www.snh.gov.uk/climate-change/helping-nature/taking-action/success-story-3/>

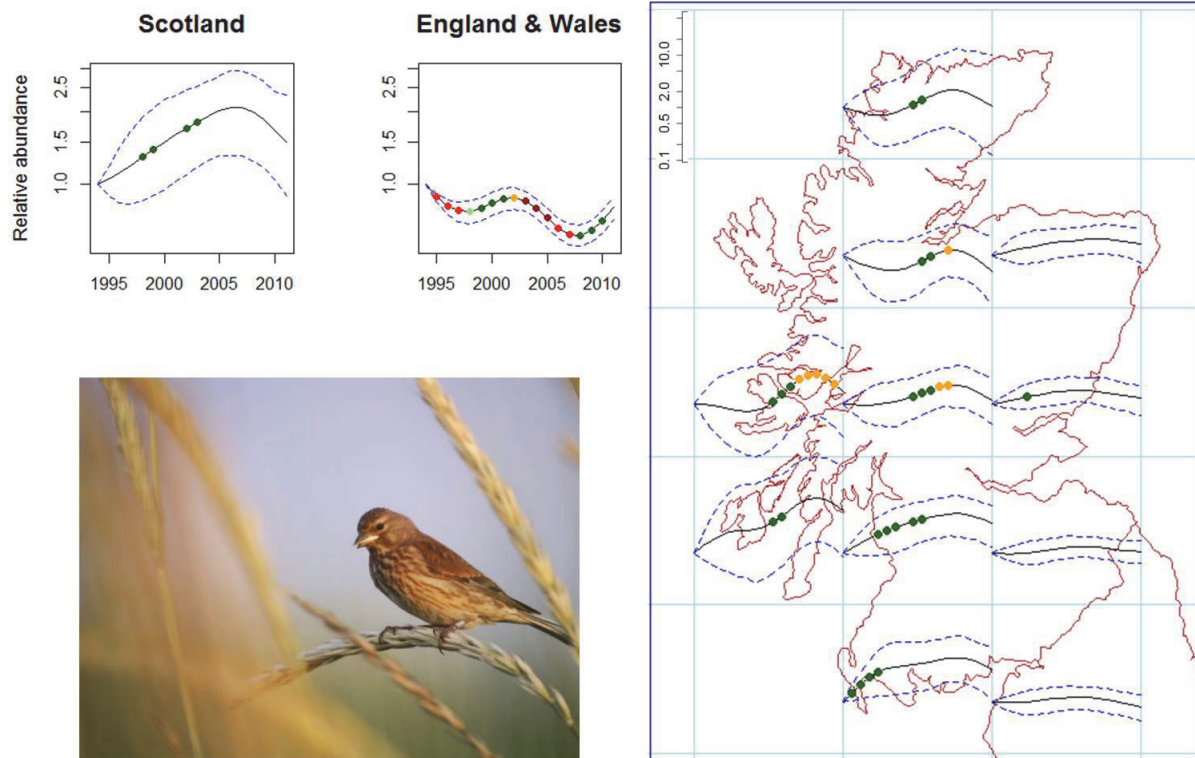
<sup>18</sup> <http://www.rspb.org.uk/ourwork/projects/details/220840-strathspey-wetlands-and-waders-initiative>

<sup>19</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/FarmlandWaders)

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Increase	Stable	70-90,000 pairs	Red	LC

## Linnet

Linnets are a widespread and fairly common resident breeding bird over most of lowland Scotland (Newton, 2007). Their distribution has changed little since the 19<sup>th</sup> century, although then they were locally distributed in the Inner Hebrides and absent from Shetland and the Outer Hebrides (Holloway, 1996). The latest BTO Atlas (2007-11) shows an expansion in linnet range with more birds breeding in the north and west<sup>20</sup> with birds now breeding in the Outer Hebrides and Shetland. The trend for Scotland shows a steady increase with stabilisation and a possible decline in the short term. In England and Wales there has been a gradual decline with suggestions of an increase in the short term.



The trends are relatively stable in the east of Scotland and increasing in the west.

### *What factors are driving populations?*

Newton (2007) highlighted the switch from spring-sown to autumn-sown grain, the use of herbicides and the decrease in turnip production and other arable crops as being the main causes for changes in linnet numbers. Increased cultivation of palatable varieties of oil-seed rape may have helped halt downward trends and contribute to the observed increase (Newton, 2007). Loss of breeding habitat (they breed in scrubby bushes such as gorse) may also be a contributory factor to their historical decline (Holloway, 1996).

### *What is being done?*

Linnets benefit from good availability of seed-rich habitats including game cover crops. Parish and Sotherton (2008) showed that game-cover crops supported a significantly greater number of songbirds (including linnets) than conventional crops such as winter cereals and grass silage. Stubble management under the Environmental Stewardship Scheme in England (stubbles must remain unploughed until mid-February) led to small but consistent increases in local population growth rates (Baker *et al.*, 2012). Linnets may benefit from the SRDP Seed-eating Birds Package.<sup>21</sup>

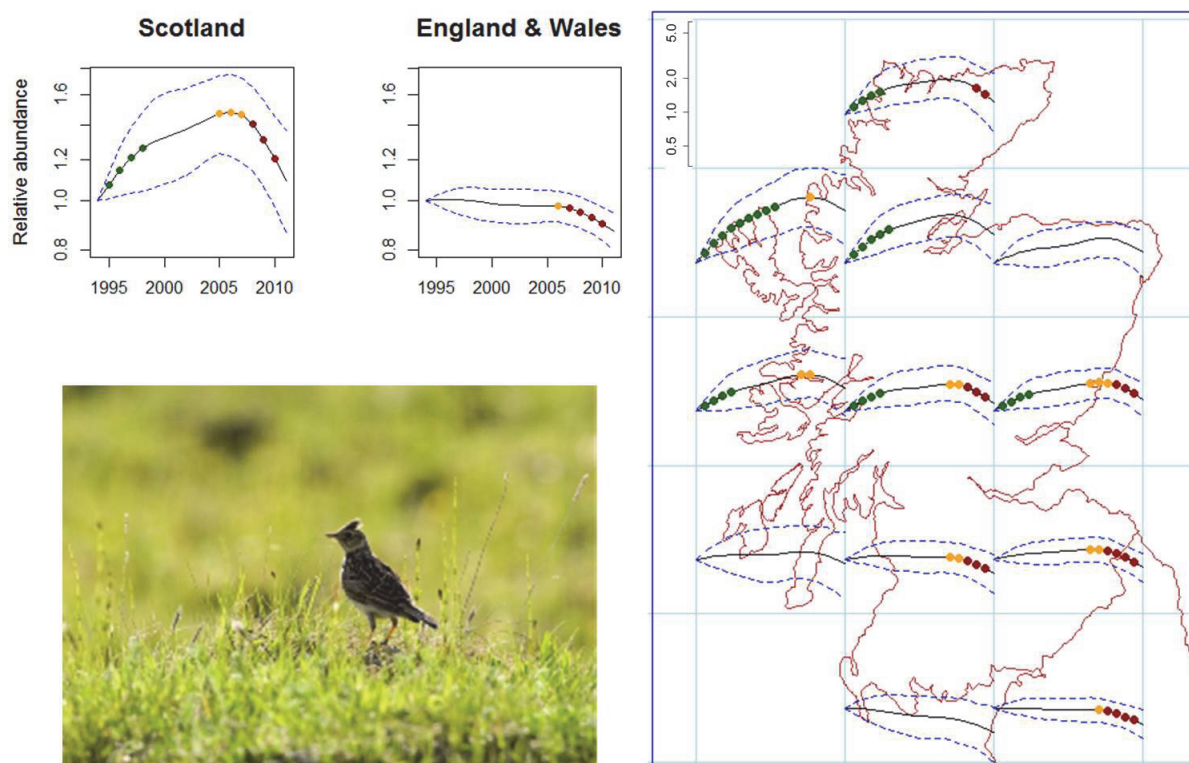
<sup>20</sup> [www.bto.org.uk/about-birds/bird-of-month/linnet](http://www.bto.org.uk/about-birds/bird-of-month/linnet)

<sup>21</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds)

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Stable	Decrease (accelerating)	290,000-557,000 pairs	Red	LC

## Skylark

The skylark is common and widespread in Scotland, breeding in grasslands from coastal areas to the uplands (Dougall, 2007). The distribution of skylarks has been largely driven by the availability of suitable breeding habitat, and by changes in land use. The capture of skylarks for food<sup>22</sup> up to the start of the 20<sup>th</sup> century did reduce numbers in some areas (Holloway, 1996). Skylarks in Scotland have shown relatively stable trends until fairly recently (Raven *et al.*, 2005). The latest trend shows a significant decline over the past five years, although the overall trend from 1994-2011 is stable. In contrast there has been considerable evidence of declines in England of skylarks since the 1970s (Donald, 2004).



Regionally the trends are variable, with significant increases in mid- and west Scotland and declines now appearing in the south and parts of the north.

### *What factors are driving populations?*

Wilson *et al.* (2009) highlighted that modern cropping regimes (such as autumn sown cereals, oilseed rape and silage) produce habitats that provide feeding during the winter but which are largely unsuitable for nesting during the breeding season. The changes to farming practices as a result of climate change, such as new cropping regimes or crop types, will likely influence the distribution and numbers of skylarks in Scotland. However, these changes should be considered alongside the fact that skylarks use a range of other habitats, from coastal dunes to upland heaths (Fuller *et al.*, 2004), where they favour areas of relatively short grassland (Pearce-Higgins and Grant, 2006).

### *What is being done?*

Studies have shown (e.g. Wilson *et al.*, 2009; Donald, 2004; Morris *et al.*, 2004) that skylarks can benefit from targeted management, in particular the provision of uncropped 'skylark plots' enabling later breeding attempts and greater protection from predators, and over-winter stubbles for feeding areas. Skylarks may benefit from the SRDP Seed-eating Birds Package.<sup>23</sup>

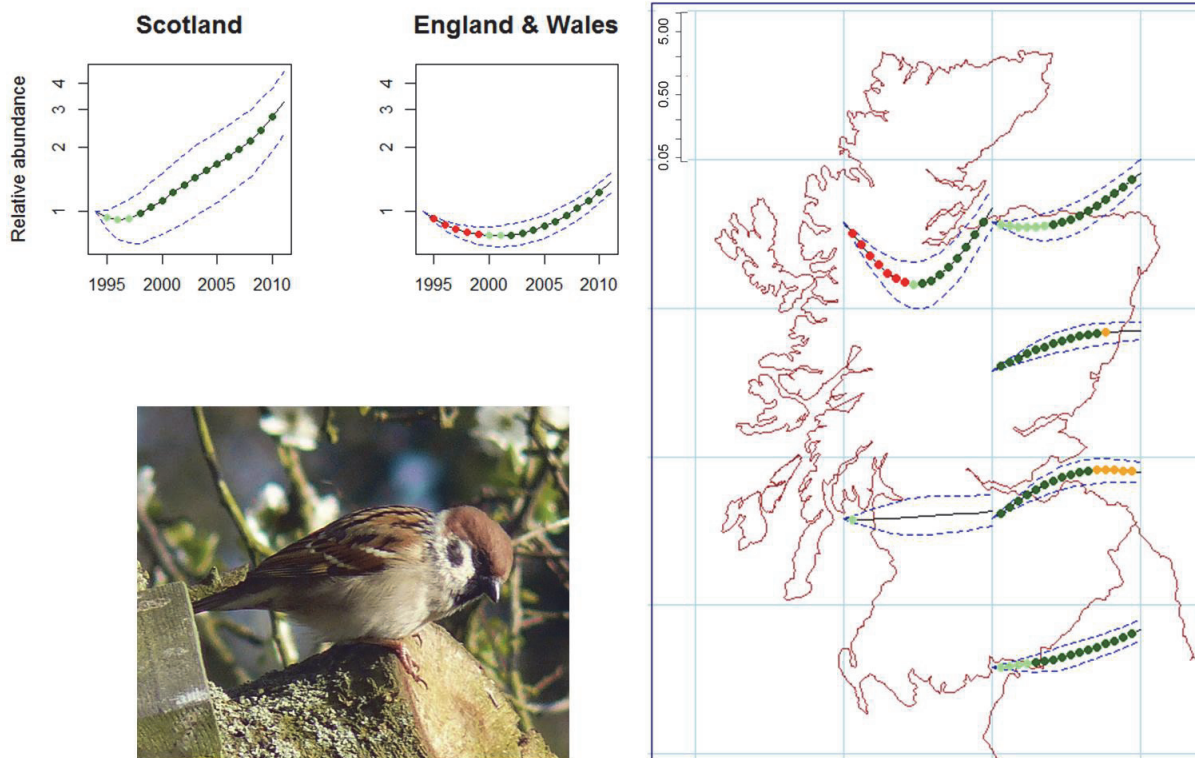
<sup>22</sup> In 1840 a pie of 300 larks was served at the dinner at the opening of the Forth Bridge (Harvie-Brown and Buckley, 1892).

<sup>23</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds)

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Increase	Increase	4,600-8,100 pairs	Red	LC

## Tree Sparrow

The tree sparrow is a scarce, although locally common, breeding resident in lowland farmland areas of mainland Scotland (Coates, 2007). They are typically found in eastern areas of Scotland. Historically tree sparrows have always had a patchy distribution across Scotland (Holloway, 1996). Globally they have a wide distribution. In Europe they are associated with lightly wooded areas around farmland, in Asia they are commonly found in towns and cities. They can have a very productive breeding season laying up to three clutches in a year (Coates, 2007). The trend for Scotland is one of a steady increase.



Regionally trends are generally increasing. There was evidence of a decline in the Inner Moray Firth area in the 1990s, followed by a period of steady increase (Coates, 2007).

### *What factors are driving populations?*

Field and Anderson (2004) found that birds preferred breeding sites next to wetland areas on farmland as these may provide invertebrate food resources which are important for feeding chicks. Tree sparrows have been affected by agricultural intensification, including changes to cropping regimes. The increase may also be partly attributed to an expansion in nestbox schemes, which has seen increased numbers of tree sparrows in many areas (Coates, 2007).

### *What is being done?*

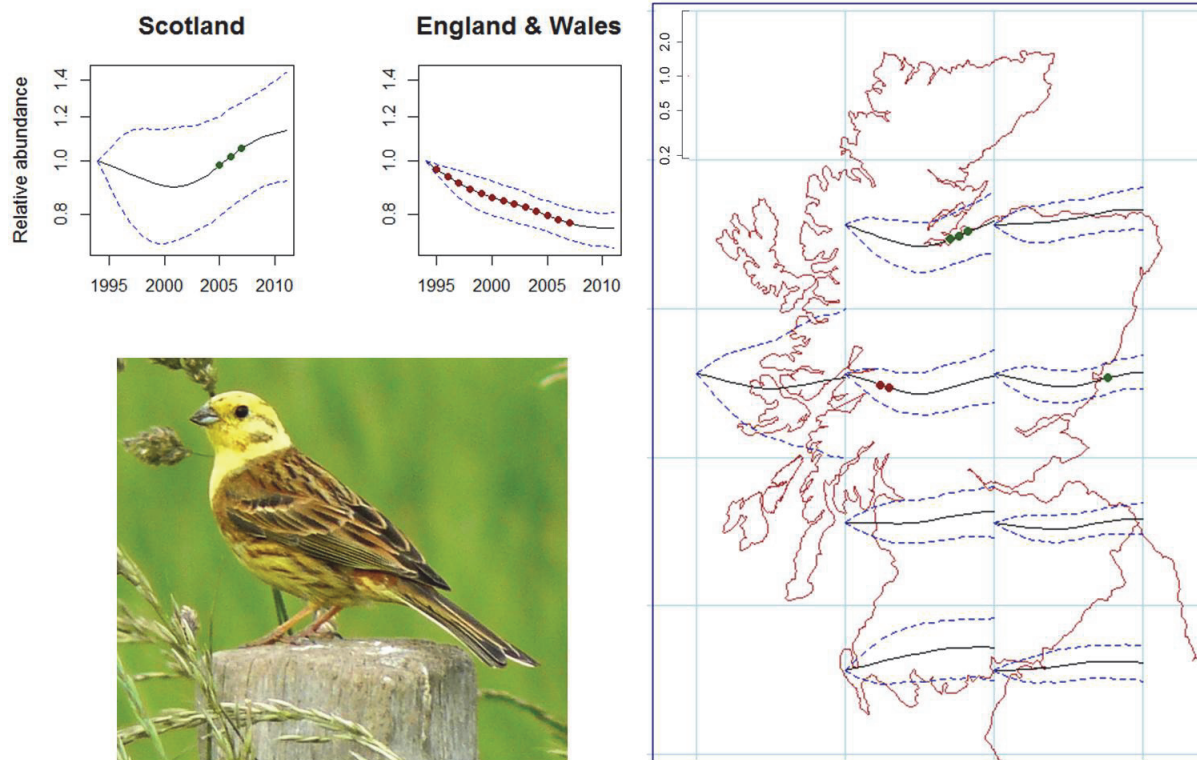
Hancock and Wilson (2003) demonstrated that the provision of seed-rich habitats, in particular under-sown cereal stubbles in the winter, supports tree sparrows. Tree sparrows will readily use nest boxes and in several areas (such as round the Moray Firth) these have assisted birds when nest sites have been a limiting factor (Coates, 2007). Tree sparrows may benefit from the SRDP Seed-eating Birds Package.<sup>24</sup>

<sup>24</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds)

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Stable	Increase	140,000-220,000 pairs	Red	LC

## Yellowhammer

The yellowhammer is a widespread and locally common resident bird (Calladine, 2007). It is mostly found on lowland farmland around the east coast of Scotland. It was one of the most common birds throughout Britain and Ireland in the 19<sup>th</sup> century (Holloway, 1996). This widespread distribution was mostly attributed to a large increase in cereal crops and possibly to a lesser extent aided by planting whin hedges. In the 20<sup>th</sup> century, widespread declines and contractions of range have been observed. The trend for Scotland is a recent increase, which contrasts with the declines that are apparent for England and Wales.



Regionally the trend is generally stable with some modest increases noted in recent years.

### *What factors are driving populations?*

Studies have shown that yellowhammer numbers, similar to other farmland birds, are affected by agricultural intensification, particularly changes to cropping regimes (e.g. autumn sown cereals) and losses to breeding habitat (Calladine, 2007). Whittingham *et al.* (2005) found that the location of winter set-aside fields influenced the breeding distribution of yellowhammer. Set-aside fields in the summer provide an important feeding area, providing heterogeneous areas for finding insects and seeds (Douglas *et al.*, 2010). Like many farmland birds, insects form an important high-protein diet for their chicks, and access to this food source has been shown to improve the chicks condition (Douglas *et al.*, 2012).

### *What is being done?*

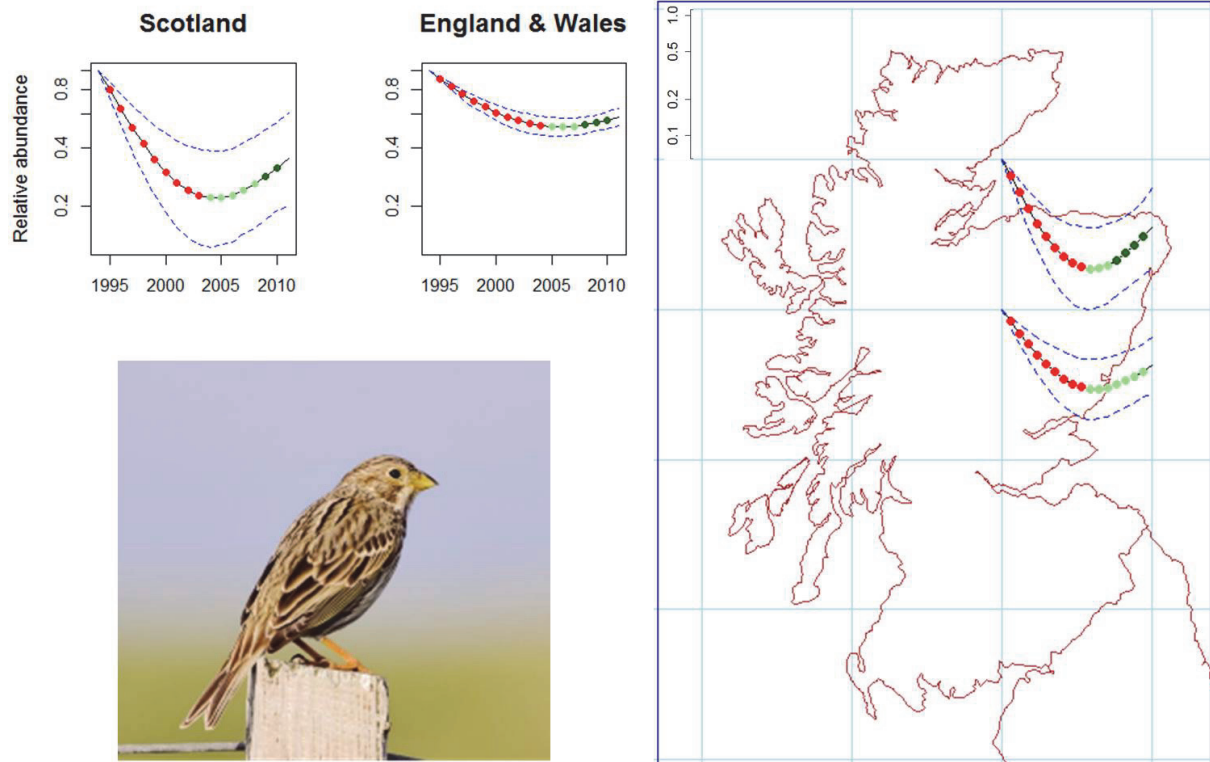
In Scotland there are no targeted projects for yellowhammers. However based on studies in England and Wales such as those by Whittingham *et al.* (2005), they would appear to be responsive to appropriate targeted farmland management. Yellowhammers may benefit from the SRDP Seed-eating Birds Package.<sup>25</sup>

<sup>25</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/Seedeatingbirds)

Long-term trend	Short-term trend	Population	BoCC3	IUCN
Decrease	Increase	c.800-1,000 singing males	Red	LC

## Corn Bunting

Historically, the corn bunting was a widespread and common farmland bird (Maggs, 2007). Their numbers have declined since the start of the 20<sup>th</sup> century largely as a result of the modernisation of farming practices, such as changes to crop rotations with fewer over-winter stubbles and grass leys (Aebischer, 1990). Recent targeted farm management interventions in eastern Scotland have slowed the declines of corn buntings (Perkins *et al.*, 2008). The Scotland trend shows a significant decline up to 2003, since then the population has begun to increase. The trend for England and Wales shows a similar pattern of decline followed by a small recovery.



The trends in the two Scottish regions with adequate data are similar, although the trend in the more northerly region has shown a greater recent increase than further south. Surveys in the Western Isles have also shown a decline (Wilson *et al.*, 2007).

### What factors are driving populations?

Several studies have looked at the corn bunting decline (e.g. Perkins *et al.*, 2011; Brickle *et al.*, 2000; Donald *et al.*, 1994). The results all point towards agricultural intensification being the main driver behind the declines, in particular the loss of winter stubbles (Donald *et al.*, 1994). Provision of insect-rich habitats during summer, including grass margins around arable fields, cereal crops with no herbicide applications, and set-aside that is left unsprayed and uncut throughout the summer have been shown to reduce declines (Perkins *et al.*, 2011). A study in Ireland by Taylor and O'Halloran (2002) found no evidence to support the idea that changes in populations are currently due to climatic change. Changes to cropping regimes as a result of climate change are therefore likely to be more influential on corn bunting populations than the direct impacts of climate on the birds.

### What is being done?

The Farmland Bird Lifeline project, funded by RSPB, SNH and the Biodiversity Action Grants Scheme has started to engage farmers in targeted management for corn buntings. Although there are some promising signs, corn buntings are still far from being the common and widespread farmland bird that they were in the 1900s (Perkins *et al.*, 2008). Corn bunting projects have been supported through a dedicated SRDP package.<sup>26</sup>

<sup>26</sup> [www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/CornBuntings](http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Packages/CornBuntings)

## The differences in the national trends

The variation we have shown in biodiversity trends between Scotland and England and Wales combined can be used to consider potential drivers of those patterns. For example, we would expect that climate-change related patterns would show a north-south gradient in population trends, as previously recorded in relation to distribution (Thomas and Lennon, 1999) and community change (Devictor *et al.*, 2012). This expectation is consistent with the generally more positive population trends for seed-eating farmland birds in northern Britain than in the south. This may be related to changes in the quality of breeding habitats (Ockendon *et al.*, 2012; Morrison *et al.*, 2013). Farmland in the south-east of England is managed more intensively in Britain than elsewhere (Wilson *et al.*, 2009), with more homogeneous arable landscapes, which are likely to reduce farmland bird abundance and diversity (Pickett and Siriwardena, 2011). Given that agricultural intensification has a greater role than climate change in driving seed-eating farmland bird populations (Eglington and Pearce-Higgins, 2012), this may at least partially account for some of the variation between the countries.

For waders the evidence is less clear and the reasons for the differences between the countries are not well understood.

### Terrestrial Breeding Bird Indicator<sup>27</sup>

Farmland birds form part of the Terrestrial Breeding Bird Indicator. SNH maintains a suite of indicators that report progress in the delivery of Scotland's Biodiversity Strategy.<sup>28</sup> Terrestrial breeding birds in Scotland comprise both resident and migratory species. They include: familiar garden species such as blackbird and robin; woodland species such as willow warbler and goldcrest; farmland species such as linnet and goldfinch; and birds of the uplands such as raven and black grouse.

The Terrestrial Breeding Bird Indicator uses data from the BBS to show the overall trend for three groups of birds (upland, farmland and woodland) and an overall combined trend.

The Terrestrial Breeding Bird Indicator covering 1994 to 2011 showed:

- 25 of the 65 bird species increased, two stayed the same and 38 decreased in abundance; the all-species (smoothed) index increased by 11%;
- The smoothed woodland bird index increased by 44% overall;
- The smoothed farmland bird index increased by 12% overall;
- The smoothed upland bird index decreased by 11% overall;

The farmland trend is overall marginally positive, though it shows the trend for a set of farmland birds which are relatively common and some rarer birds are not included.

### Further Reading

The Changing Nature of Scotland (Marrs *et al.*, 2011) – provides a stock-take of environmental change across the land, water and seas of Scotland.

### About Trend Notes

For more information about trends in Scotland's changing environment log on to <http://www.snh.gov.uk/trends>

To propose a topic for a Trend note, or to provide feedback, please email [enquiries@snh.gov.uk](mailto:enquiries@snh.gov.uk) with the words 'Trend Notes' in the subject heading.

<sup>27</sup> <http://www.snh.gov.uk/docs/A875594.pdf>

<sup>28</sup> <http://www.snh.gov.uk/publications-data-and-research/our-changing-environment/scotlands-indicators/biodiversity-indicators/>



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