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DETERMINING THE EFFECTIVENESS OF ENVIRONMENTAL STEWARDSHIP

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Juliet Vickery, Dan Chamberlain and *David Noble* review the new scheme and explain the BTO's involvement in assessing its effectiveness.

DETERMINACIÓN DE LA EFECTIVIDAD DE ACTIVIDADES DE PROTECCIÓN AMBIENTAL
Juliet Vickery, Dan Chamberlain y *David Noble* revisan el nuevo programa y explican el papel del BTO a la hora de evaluar su efectividad.

Agri-environment schemes currently exist in 26 out of 44 European countries, costing the European Union (EU) over 24 billion Euros since 1994. Despite the cost and the importance of such schemes in maintaining healthy wildlife populations within farmland, very few rigorous, scientific studies have attempted to assess their effectiveness, and those that exist have yielded equivocal results (Kleijn & Sutherland 2003). As a result, key questions such as " is this money well spent?" and "are the options within these schemes delivering their wildlife targets, and if not why not?" remain largely unanswered.

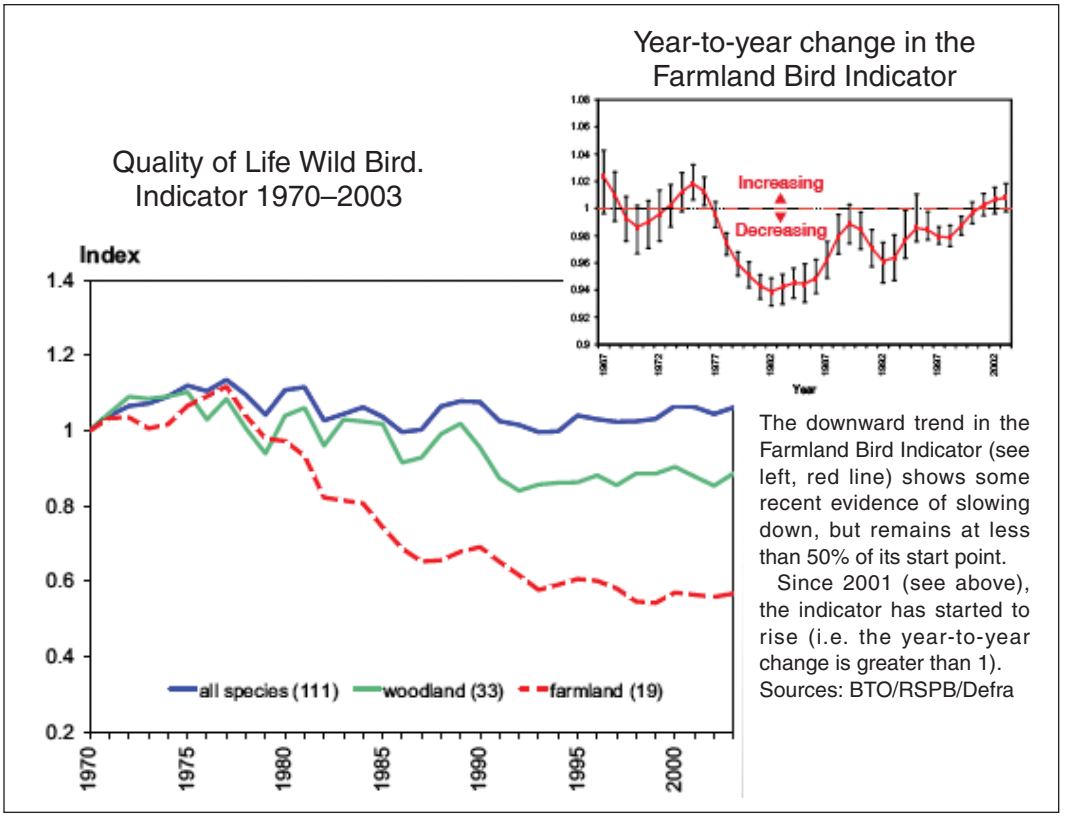
THE NEW SCHEME

In March 2005, Defra launched Environmental Stewardship (see Box 1), an agri-environment scheme that could herald big changes in the farmed countryside in England. Not only has Defra committed a great deal of money to the scheme itself, it has also now committed to research designed to monitor the effectiveness of the entry level component through an exciting new BTO project.

Environmental Stewardship has a number of primary objectives, one of which is wildlife conservation (see Box 1). An index of long-term trends in farmland bird populations has been adopted by the UK government as one of the 15 headline Quality of Life Indicators — an indicator in this case of declines in biodiversity in the wider countryside (see Figure 1). Of the 19 species in the Farmland Bird Indicator (FBI), seven (Woodpigeon, Stock Dove, Jackdaw, Rook, Whitethroat, Goldfinch and Greenfinch) have increased, and 12 (Grey Partridge, Kestrel, Lapwing, Turtle Dove, Skylark, Yellow Wagtail, Starling, Tree Sparrow, Linnet, Yellowhammer, Reed Bunting and Corn Bunting) have declined since 1970. The government has set a target of reversal of the decline in the FBI by 2020 and sympathetic habitat management, under Environmental Stewardship, will be a key tool in achieving this goal.

ASSESSING ITS EFFECTIVENESS

The FBI is now based largely on data from the BTO/JNCC/RSPB Breeding Bird Survey (BBS), so this survey will provide the means by which the long-term success of Entry Level Stewardship is judged with respect to farmland biodiversity. However, 2020 is a long way off and it is



The downward trend in the Farmland Bird Indicator (see left, red line) shows some recent evidence of slowing down, but remains at less than 50% of its start point.

Since 2001 (see above), the indicator has started to rise (i.e. the year-to-year change is greater than 1).

Sources: BTO/RSPB/Defra

FIGURE 1.

clearly important to assess the effectiveness of the scheme in the shorter term in order, for example, to modify or promote certain key management prescriptions. To this end, Defra approached the BTO with the question: How many BBS squares would be adequate to detect population changes in farmland birds (as a result of ELS) with a 90% degree of certainty? Power analysis (see Box 2) estimated that 2,000 BBS squares would provide adequate power to detect short-term population changes over time in two important landscapes — arable and pastoral farmland. This sample size would also allow the detection of differences between ELS and non-ELS squares for two key species, Skylark and Yellowhammer, and for at least one of Lapwing, Starling and Linnet.

A crucial component of a rigorous assessment of the effectiveness of ELS is to have a baseline in place before any habitat management occurs. Although ELS was launched in March, there will be little management on the ground until after harvest 2005. This summer was then a crucial baseline year during which these 2,000 BBS squares needed to be surveyed. BTO volunteers currently cover c. 1,000 arable or pastoral farmland squares in lowland England. Finding volunteers to cover the 1,000 extra BBS squares required, at relatively short notice, was obviously going to be impossible, so Defra agreed to fund professional fieldworkers to undertake the task of surveying the extra squares in spring and summer 2005. Even so, finding a team of fieldworkers was still a major undertaking, but we managed to get a team of 24 ornithologists out in the field by early April. As the data were to be used to augment the standard BBS sample, the methods were identical. Squares were selected randomly, the only caveats being that each square had to be lowland and predominantly farmland (66% coverage of arable or pastoral land) and within England (Wales, Scotland and Northern Ireland are covered by different agri-environment schemes).

BASELINE DATA

The outputs from this year will be summary statistics of the current state of England's farmland bird populations, based jointly on the data gathered by the professional fieldworker and the core BBS data. Funding permitting, these same squares will be re-surveyed in 2008 and 2011. The scheme will be reviewed in 2010 and thus data from the 2008 resurvey will be fed into this review process. Next year the RSPB will commence a parallel study focusing on the effectiveness of Higher Level Stewardship (HLS), carrying out more intensive studies on key target bird species, in a smaller number of locations. Once again this will ensure a good baseline year as HLS will only be available at the end of this year.

Scientists and policy makers have been calling for effective monitoring of ELS and HLS for some time now. This Defrafunded package paves the way for just this and provides added optimism that Environmental Stewardship really will deliver the goods for farmland birds.

REFERENCE

Kleijn, D & Sutherland, W J. 2003. How effective are European agri-environment schemes in conserving and promoting biodiversity? *Journal of Applied Ecology* 40, 947–969.

BOX 1
ENVIRONMENTAL STEWARDSHIP

The 'Curry Report' (Curry 2000) made two key recommendations with respect to Agri-Environment Schemes (AES). First, that there should be a new 'broad and shallow' scheme available to all farmers and landowners and second, that current schemes (such as Environmentally Sensitive Areas [ESA] and Countryside Stewardship Scheme [CSS]) should be streamlined into a single scheme (to act as the higher level of the broad and shallow scheme). These recommendations have largely shaped the new AES launched in March 2005 — Environmental Stewardship. The scheme has three elements: Entry Level Stewardship (ELS), Organic Entry Level Stewardship (OELS) and Higher Level Stewardship (HLS). (For more details see www.defra.gov.uk/erdp/schemes/es/default.htm)

ENTRY LEVEL STEWARDSHIP is a 'whole farm scheme' open to all farmers and land managers in England. In line with the idea of a 'broad and shallow' approach it is designed to encourage as many farmers as possible to adopt simple environmental management options. The scheme has four objectives, to: (i) conserve wildlife; (ii) protect historic features; (iii) maintain landscape character; and (iv) improve water quality and reduce soil erosion.

Farmers can choose from a range of options including in-field, margins or boundary options, each of which earns a number of points per hectare. Once a farmer has selected enough of these options to score the minimum of 30 points per hectare, entry to the scheme is guaranteed resulting in a flat-rate payment of £30 per hectare per year. Agreements last five years and there is a total of 60 options to choose from, including options for hedgerow or ditch management, protecting in-field trees, historic and landscape features (e.g. managing scrub on archaeological sites), buffer strips, beetle banks, wild bird seed mix, Skylark scrapes, stubbles, soil protection and grassland management (lowlands and uplands). Farmers can earn points for any of these already in place on a farm.

ELS will cost around £150 million annually and hopes for 'delivery' are high. Evaluation of the ELS pilot showed that the scheme was practical and farmers were positive about it. Defra predict an uptake of around 80% of farmers/land owners over the next five years. If this proves to be the case, it will pave the way for major change in the farmed environment. (For more details see www.defra.gov.uk/erdp/ schemes/els/default.htm)

HIGHER LEVEL STEWARDSHIP has the same four objectives as ELS (although 'improve water quality and reduce soil erosion' is replaced with 'natural resource protection') but it

BOX 1
(Continued)

includes a fifth of 'promoting public access and understanding of the countryside'. Farmers will usually have to be in ELS or OELS in order to enter HLS. HLS will be offered to farmers from November 2005.

HLS is designed to deliver significant environmental benefits in high priority sites. The management is more complex, often requiring a higher level of advice and support. Thus, while ELS options are referred to as 'broad and shallow', HLS options are 'narrow and deep'. Agreements last for 10 years and must be accompanied by a Farm Environmental Plan (FEP) which identifies features on the farm, their condition and the most appropriate management. Entry to HLS is not guaranteed. It is awarded on merit depending on where the most environmental benefit is likely to be achieved. As for ELS, there is a very wide range of options including creation and maintenance of wood pasture, restoration of traditional orchards, maintenance of traditional water meadows, fallow plots for ground nesting birds ['Lapwing plots'], low input cereal followed by stubble and a spring crop, arable reversion to unfertilised grass, maintenance of species rich seminatural grassland, creation of wet grassland for breeding waders, maintenance or creation of upland heath for rough grazing, educational access, maintenance or restoration of lowland heath, creation of inter-tidal saline habitat on grassland, and maintenance or creation of reed beds.

HLS options will also be more 'targeted' and tailored to meet the needs of priority species and habitats. Targeting for the scheme will be done on the basis of Joint Character Areas. These were first devised as a means of describing the essential character of distinct areas of the English Countryside, based on the landscape, wildlife and natural features (www.defra.gov.uk/erdp/schemes/sssis/ default.htm). For birds, the targeting is partly based on the Farmland Bird Database (FBD) which identifies regions (and JCAs) with the highest concentrations of target farmland bird species (see *BTO News* 255 p25). Existing ESA and CSS schemes will be allowed to run to their conclusion, agreement holders will then have to decide whether ELS only or ELS and HLS is most appropriate for their holding.

The amount of money spent annually on HLS will be £15 million plus the money 'released' from expiring ESA and CSS agreements. (For more details on HLS see www.defra.gov.uk/erdp/schemes/

BOX 2
POWER ANALYSIS

Put simply, power analysis is a statistical way of answering questions such as "how many BBS squares would I need to detect a given change in bird numbers (i) over six years and (ii) between 1-km squares with land under ELS and 1-km squares with no land under ELS?" Power to detect change tends to increase as sample size increases. A high level of power (90%) was used in the analysis, giving us a 90% chance of detecting an existing effect of ELS on bird populations. The analysis uses current abundance for each species as the basis for simulating different scenarios based around assumptions about the likely effect of ELS. In this case, it was assumed that the uptake of ELS would be 70% of farms, that ELS would result in 10% more birds on these farms and that overall population increase (ELS and non-ELS land combined) would be relatively subtle i.e. 5% over a period of six years. These figures are conservative and the level of power is high. It is quite conceivable that the ELS may result in population increases of over 5% for certain species, in which case, the chances of detecting significant effects are higher than 90%.