

Set Aside

Title

Set Aside 1996-1997

Description and Summary of Results

A number of long-term monitoring programmes have shown that many groups of plants and animals in farmland and elsewhere have sharply declined in numbers since the 1970s, eg the results of Countryside Survey in 1990 showed a marked reduction in hedgerow length and plant biodiversity in arable landscapes since 1978. Analysis of the BTO's monitoring programmes, supported by the two breeding atlases, also revealed that many of Britain's farmland bird populations have suffered long-term declines, with the species involved representing a broad range including such as Grey Partridge *Perdix perdix*, Skylark *Alauda arvensis*, Song Thrush *Turdus philomelos*, and Tree Sparrow *Passer montanus*. Set-aside was introduced into farmland by the European Commission, as part of the Common Agricultural Policy (CAP). The aim was to reduce agricultural surpluses by removing areas of land from production. In the summer of 1994, the rate was set at 15% of arable land for rotational and 18% for non-rotational set-aside. Set-aside then occupied approximately 0.7million ha. For 1995, the rates were reduced to 12% and 15% respectively and in 1996 a 'flexible' scheme allowed non-rotational set-aside to be returned to the crop rotation with a flat rate of 10%. This rate was reduced to 5% for the summer of 1997. Since the 1970s there was growing evidence linking bird declines with major changes in agriculture, these including increased use of pesticides and a switch from spring to autumn sown cereals. Set-aside provides areas of land that are relatively free from pesticides and fertiliser inputs and, in the case of most rotational set-aside, supports overwinter stubble. So, although introduced as an agricultural measure, it was realised that there were potentially some environmental benefits too. The BTO's Set-Aside Survey was carried out to try to identify these potential benefits and to see how much effect particular measures could have to reduce the rate of decline of farmland species.

The aim was to examine the extent to which a wide range of bird species utilise set-aside by comparing densities and distribution on rotational and non-rotational set-aside with those on adjacent crops. The species studied included insectivores (eg Song Thrush), seed-eating species (eg Linnet *Carduelis cannabina*, Yellowhammer *Emberiza citrinella*), boundary nesting species (eg Blackbird *Turdus merula*), and field nesting species (eg Skylark and Lapwing *Vanellus vanellus*). The location of set-aside areas next to crops or grassland allowed geographical and temporal comparison with intensively farmed fields, and to identify field preferences by birds having controlled for confounding factors such as location and season.

Bird densities were found to be significantly higher on rotational set-aside than on winter-cereals for all bird categories, and densities on rotational set-aside consistently exceeded those recorded on neighbouring fields from April to July (except for crow species which preferred grassland). This was also true for April and May only when there was no difference in vegetation height between set-aside and crops. Insectivorous thrushes also utilized rotational set-aside in preference to crops, although possibly this preference

depended on the amount of cover provided, since the result contrasted with their general indifference towards set-aside as a short winter cover or stubble. On 10 farms where both rotational and non-rotational set-aside were present, relative bird densities were highest on rotational set-aside for all bird categories except the crows (preference for non-rotational set-aside) and lowest on winter cereals.

(A parallel study in winter showed that several declining farmland species selected set-aside stubble over crops and grassland with a notable avoidance of winter cereals and plough.)

Methods of Data Capture

Out of a random sample of 200 farms in England, stratified by set-aside type (rotational, non-rotational) and geographic area (arable and mixed farming regions), 92 were surveyed in 1996 (40 with rotational, 43 with non-rotational set-aside and nine with both) and 63 of these also in 1997 (29 rotational and 27 non-rotational, seven with both). Average plot size was 44ha (range 15-107ha) and plots included one pre-selected set-aside field and 5-10 neighbouring crop, set-aside or grass fields.

Observers made four visits to a farm plot between April and July (one visit per month with at least two weeks between visits) in both 1996 and 1997. On each visit, observers walked around all field boundaries recording the location (field or boundary) of all birds seen or heard onto 1:2500 maps of their plot – a modification of the standard territory mapping approach used in the BTO's Common Bird Census, but used here to give relative, not absolute, estimates of numbers of birds on different fields and boundaries. Observers were asked to finish a visit within 3 hours and before 10am, and were requested to vary the survey route between visits to ensure that diurnal variation in bird activity did not bias the recorded distribution. No visits were made in heavy or persistent rain or in wind greater than force 4.

Observers also recorded habitat features of each boundary including hedge height and width, the frequency of trees present and crop type. Boundary lengths and field areas were extracted from the maps. Farmers provided crop details, which were classified into six categories: 1) *Rotational set-aside*: dominated by natural regeneration of cereal volunteers (from the previous crop) and indigenous flora (95.5% of fields), or a sown grass cover (4.5% of fields); 2) *Non-rotational set-aside*: natural regeneration or a sown grass cover, at least two years old; 3) *Winter cereal*: autumn-sown wheat, barley or oats; 4) *Spring cereal*: spring-sown wheat, barley or oats; 5) *Non-cereal*: brassicas (including oilseed rape), legumes, root crops, linseed, maize, or other non-cereals; 6) *Grassland*: combined ley grass (whether grazed or non-grazed), permanent pasture (whether grazed or non-grazed), silage or hay. To help interpret levels of bird detectability between field-types, observers estimated average crop height by eye in 10cm categories for each field on each visit. This provided a crude measure that was used to identify extreme differences in crop height that could have confounded the bird count data.

Bird species were assigned to one of six categories (gamebirds, pigeons, thrushes, crows (only *Corvus* species), granivores and Skylarks) to make use of all the data available and increase analytical sample sizes. A botanical survey of each set-aside field was carried out by ADAS staff, during which data were recorded from thirty 0.25m² quadrats per field, positioned along five transects extending from the boundary into the field (six quadrats per transect).

Purpose of Data Capture

The aims of the survey were: 1) to assess the relative use of set-aside by birds compared to nearby crops or grassland; 2) to determine which groups of bird species were most closely associated with set-aside on lowland arable farms; and 3) to compare the use made by birds of two distinct types of set-aside; rotational and non-rotational.

Geographic Coverage

92 farms all across England and Wales and covering a range of types.

Temporal Coverage

The breeding seasons of 1996 and 1997 with 4 visits to each plot spread between April and July.

Other Interested parties

The overall project was led by the Institute of Terrestrial Ecology (now Centre for Ecology and Hydrology) with BTO and ADAS as partners. It was funded by the then Ministry of Agriculture, Fisheries and Food.

Organiser(s)

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Publications

The main results are in:

Henderson, I.G., Cooper, J., Fuller, R.J. & Vickery, J.A. 2000. The relative abundance of birds on set-aside and neighbouring fields in summer. *Journal of Applied Ecology* 37: 335-347.

Some more general results from set-aside are in:

Henderson, I.G. & Evans, A.D. 2000. Responses of farmland birds to set-aside and its management. Pp 69-76 in Aebischer, N.J., Evans, A.D., Grice, P.V. & Vickery J.A. (eds) *Ecology and Conservation of Lowland Farmland Birds*. BOU, Tring.

Results of some of the more intensive work done in conjunction with the survey are included in:

Henderson, I.G., Vickery, J.A. & Fuller, R.J. 2000. Summer bird abundance and distribution on set-aside fields on intensive arable fields in England. *Ecography* 23: 50-59; and

Henderson, I.G., Critchley, N.R., Cooper, J. & Fowbert, J.A. 2001. Breeding season response of Skylarks *Alauda arvensis* to vegetation structure in set-aside (fallow arable land). *Ibis* 143, 317-321.

The survey was noticed in *BTO News* number 216/7.

Available from NBN?

No.

Computer data -- location

BTO Windows network central area.

Computer data -- outline contents

The counts of birds and the habitats recorded are in Excel files for each year. Some associated SAS programs used to analyse the data are included.

Computer data -- description of contents

The data files (Excel) are:

Bird data in fields: afield96.dat and afield97.dat with columns:

Plot number; Date (days from 1 January); Visit (1-4); Field ID; HAB1 (coding system not certain); Crop height (on ordinal scale in 10cm categories); Species code (2 letter, ZZ?); Count; Field Count; Area (ha).

Bird data in Boundaries: abnd96.data and abnd97.dat with columns:

Plot number; Date (days from 1 January); Visit (1-4); Boundary number ID; Species code (2-letter); Count; Field Count.

Habitat data: ahab96.dat and ahab97.dat with columns:

Plot number; Date (days from 1 January); Boundary number ID; Type (coding?); Height (m); Width (m); L Tree; D Tree; BS1; Habitat in Field 1; Field 1 ID; Habitat in Field 2; Field 2 ID.

Length of boundaries: aleng96.dat and aleng97.dat with columns:

Plot number; Boundary ID; length (m).

Also 3 Excel files containing some bird data but of unknown use or provenance (cbc... so probably something to do with Common Birds Census style counts)

Information held in BTO Archives

2 Archive Boxes and 2 Transfer Cases containing all the data and maps.

Notes on Access and Use**Other information needed****Notes on Survey Design****Specific Issues for Analysis**