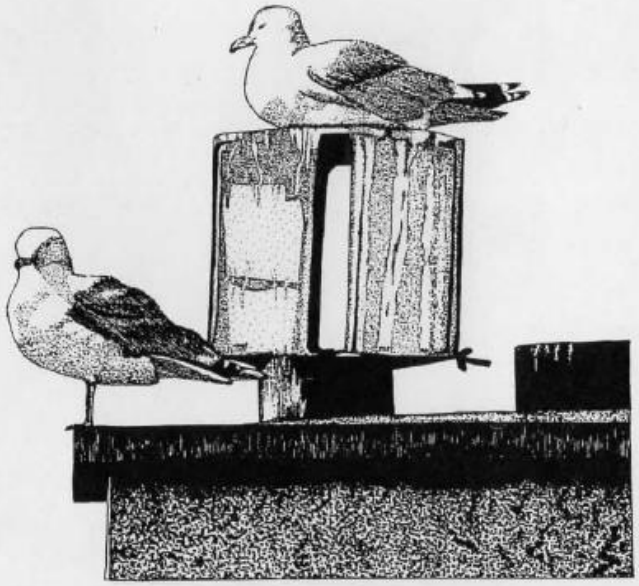
THE GLOUCESTERSHIRE NATURALIST

***Special Issue*:**
ORNITHOLOGICAL STUDIES IN GLOUCESTERSHIRE

No.11 **1998**



THE GLOUCESTERSHIRE NATURALIST

An occasional publication of the Gloucestershire Naturalists' Society

No.11 1998

Editor : Robin M. Sellers

***Special Issue*: ORNITHOLOGICAL STUDIES IN GLOUCESTERSHIRE**

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VIGNETTES

ORNITHOLOGY AND THE GLOUCESTERSHIRE NATURALISTS' SOCIETY

Robin M. Sellers

Although the Gloucestershire Naturalists' Society (GNS) caters for a wide range of wildlife interests, ornithology has always been one of the most important. This article describes how ornithology has developed in the GNS and the contribution that the GNS has made to recording and understanding the county's birds.

The GNS began life in 1948 as the Cheltenham & District Naturalists' Society. From modest beginnings it grew quickly, and in November 1956 extended its recording area to cover the northern part of the old county of Gloucestershire, in the process changing its name to the North Gloucestershire Naturalists' Society (NGNS). In 1963, with the agreement of other local birdwatching and natural history societies, and following establishment of the *Gloucestershire Bird Report* (see below), the NGNS changed its recording area to encompass the whole of the then county of Gloucestershire. With the county boundary changes of 1974, and a further revision to the Society's recording area, it changed its name again to the Gloucestershire Naturalists' Society.

Amongst other things, the GNS and its predecessors were set up to "stimulate an interest in natural history and to further its study, . . . and to publish reports on the biology of the area . . ." (Gloucestershire Naturalists' Society 1996). From the very beginning ornithology has played an important part in achieving these goals and in the early years the Society even had its own 'Ornithological Section'. The Society has sought to promote an interest in birds (and indeed in all aspects of natural history) by a variety of means including the encouragement of recording of the county's birds, through a programme of indoor meetings during the winter months, and field meetings and excursions primarily in the spring and summer months, as well as providing its members with access to one of the finest private natural history libraries in Britain.

The recording of bird sightings by members has proved to be very profitable, and over the years has grown to provide an invaluable archive of the county's avifauna; currently the Society has something of the order of 100,000 bird records on file. Since its earliest days the Society has attempted to produce summaries of this material, both to further understanding of the status, distribution, movements and habits of birds in the county, as well as providing feedback to observers on what has been seen. Annual summaries of these sightings have

TABLE 1. Annual reports of Gloucestershire birds published since 1948 [a]

Year	*Type of report*	*Source* [b]	*Editor*
1948-49	Ornithological Records	CDNS dup. rep.	L.W.Hayward
1948-50	Ornithological Report	CDNS dup. rep.	L.W.Hayward
1951-52	Ornithological Notes	CDNS Report	L.W.Hayward
1951	Ornithological Notes	Proc. CNFC	G.L.Charteris
1952-53	Ornithological Notes	Proc. CNFC & CDNS Report	G.L.Charteris
1954-1956	Ornithological Notes	Proc. CNFC & CDNS Report	G.L.Charteris & C.M.Swaine
1957-1962	Ornithological Report	Proc. CNFC & NGNS Report	G.L.Charteris & C.M.Swaine
1963-1967	Glos. Bird Report	NGNS	C.M.Swaine
1968-1972	Glos. Bird Report	NGNS	M.A.Ogilvie & C.M.Swaine
1973-1978	Glos. Bird Report	GNS	M.A.Ogilvie & C.M.Swaine
1979-1982	Glos. Bird Report	GNS	J.D.Sanders
1983	Glos. Bird Report	GNS	R.D.Goater
1984-1985	Glos. Bird Report	GNS	J.D.Sanders
1986-1989	Glos. Bird Report	GOCC	J.D.Sanders
1990-1994	Glos. Bird Report	GOCC	R.P.ffrench
1995-1996	Glos. Bird Report	GOCC	J.D.Sanders

a Updated from Swaine 1982

b dup.rep. duplicated report, CDNS Cheltenham & District Naturalists' Society, CNFC Cotteswolds Naturalists' Field Club, NGNS North Gloucestershire Naturalists' Society, GNS Gloucestershire Naturalists' Society, GOCC Gloucestershire Ornithological Coordinating Committee.

appeared since 1948, initially as stand alone reports or published in the Proceedings of the Cotteswolds Naturalists' Field Club (see summary in Table 1), but from 1963 as the *Gloucestershire Bird Report*. In 1986 responsibility for producing the Bird Report was transferred to the newly created Gloucestershire Ornithological Coordinating Committee (GOCC), which, as its name suggests, was set up to coordinate the activities of the growing number of clubs and societies in the county with an interest in birds. The GNS has been an active participant in GOCC and has continued to support the Bird Report, not only by generating many of the records the Report contains, but also by effectively underwriting the costs by taking a guaranteed number of copies of each issue which it distributes free to its members.

For many years the posts of Editor of the Bird Report and County Bird Recorder were filled by the same person, but since 1983 these functions have been split.

The work of both has been greatly assisted by a County Advisory Committee, which on the establishment of GOCC became a sub-committee of GOCC, known as the County Records Sub-committee, and, following its reorganisation in December 1994, as the Gloucestershire Records Sub-committee.

More immediate feedback to members on sightings has been possible almost since the founding of the Society through the *Journal*. Initially this appeared monthly, each issue containing a separate section of 'Ornithological Notes & Records', which continues to this day. Escalating costs, not least of postage, necessitated a change to bimonthly production from July 1982; there has, however, been a steady increase in the number of pages published. The extraordinary achievement that this almost half century of production represents has been possible in no small way due to the dedication of the Journal's Editors, W.E.Handover (Mar 1950 - Feb 1954), R.J.M.Skarratt (Mar 1954 - Sep 1962), R.J.M.Skarratt & Mrs S.C.Holland (Oct 1963 - May 1965), Mrs S.C.Holland (Jun 1965 - Jun 1982), Mrs I.Hughes (Jul 1982 - Apr 1987), R.P.ffrench (May 1987 - Dec 1992), J.Wilson (Jan 1993 - Mar 1995), and R.Homan (May 1995 to date).

From time to time special Supplements to the Journal have appeared. Of the ten produced to date, five contain information relevant to birds. Details of these are as follows:

- Supplement No.2 L.W.Hayward, 1951, Ornithological Report 1948/1950 (8pp).
- Supplement No.5 C.M.Swaine, 1959, Problems of identifying and reporting birds (8pp).
- Supplement No.8 S.C.Holland, C.E.Williams and E.Atty, 1981, Thirty years of the Society's publications (includes list of all major GNS publications and articles on birds *etc*).
- Supplement No.9 R.M.Sellers (ed), 1985, Tetrad dot-maps (24pp) (contains distribution maps for a number of bird species).
- Supplement No.10 S.Meredith, 1993, Identification Guides Supplement (20pp) (includes list of reference books on identification of birds *etc*.).

With the growing number of records, and the realisation of their potential value for conservation, the GNS in collaboration with the Gloucestershire Trust for Nature Conservation (GTNC) and Gloucester Museum considered in 1978 setting up a county Biological Records Centre in Gloucester Museum (Holland 1980). In practice this proposal was a non-starter, as the Museum did not have the resources to support such an enterprise, and following advice from Monks Wood Biological Records Centre, which coordinates recording activities nationally, it was decided that the GNS should continue to manage its own records and establish a Data Bank Sub-committee to oversee this. In collaboration with GTNC and Gloucester Museum, the initial focus was on considering how information already

on file might be made more readily available to the public. As a first step consideration was given to publication of a leaflet about natural history in the county, but this was shelved due to lack of finances. However, this did serve to emphasise the role publication should have in making natural history activities more widely known, and as a result the Sub-committee was renamed the Publications Sub-committee in 1980. Its first act was to publish an 'Information Sheet on Recording', compiled by Mrs S.C.Holland and J.D.Sanders, to improve the quality of records and encourage more recording. This was duly circulated with the February 1981 issue of the *Journal*. It has been reissued periodically ever since, the 7th Edition being circulated with the May 1998 edition of the *Journal*. The Information Sheet contains advice to observers on what sort of information to record, and useful contact addresses. To aid recording the Publications Sub-committee also organises the production and circulation of recording cards - two types are currently available, one for detailed recording (Type A record card) and a simpler version more suitable for multiple sightings (Type B); birdwatchers have mostly used the latter type.

The growing archive of bird records poses a number of problems, not the least of which is how to handle such a large data set for the purposes of analysis. Fortunately, C.M.Swaine undertook a general appraisal of the Society's ornithological records (and all other material relating to the county's avifauna) in the early 1980s and this resulted in his book, *Birds of Gloucestershire*, which appeared in 1982 (Swaine 1982). Recognising that much further analysis was possible of this and related material the Publications Sub-committee changed its name in 1982 to the Scientific & Publications Sub-committee. Its primary objectives are to (Sellers 1992):

- encourage and promote the recording of all types of wildlife in Gloucestershire;
- encourage analysis of the data collected and its timely publication;
- establish check-lists of the County's wildlife and, where sufficient information is available, detailed status reports and distribution maps; and
- oversee the Society's publications.

One of its first successes in this new guise was to establish an occasional publication called *The Gloucestershire Naturalist* as a forum for the publication of more detailed analyses. The first issue appeared in 1984 and subsequent issues have appeared as sufficient material has become available; production has been annual since Issue 5 in 1992. Issues 3 and 10 were devoted entirely to birds, and Issues 1, 5, 7, 8 and 9 all contain at least one contribution relating to birds. The present issue of *The Gloucestershire Naturalist* contains probably the most extensive analysis of information on Gloucestershire birds since the appearance of Swaine's book in 1982.

As noted above the Scientific & Publications Sub-committee has set itself the goal of establishing check-lists of the county's wildlife and since the early 1990s has had an on-going project to achieve this. Birds were one of the first groups to be

dealt with and the list published in 1992 contained 301 species (Sanders & Sellers 1992). In fact check-lists for birds based largely on the Society's records date from 1969 when Swaine published a booklet listing 274 species. A further revision and update was published in 1989 which admitted 297 species (Sanders & Sellers 1989). The diligence of the county's birdwatchers ensures that these check-lists need constant revision.

The Scientific & Publications Sub-committee also attaches considerable importance to dot-mapping to show the distribution of individual species in the county. It has produced a special map form for summarising the available records and to ensure consistency across all taxa. Unfortunately birds have not figured very prominently in the maps compiled to date and currently the only ones available at the tetrad level are:

- breeding distributions: Buzzard *Buteo buteo* (Sellers 1985), Dipper *Cinclus cinclus* (Sellers 1984), Meadow Pipit *Anthus pratensis* (Hamlett & Sellers 1983), Spotted Flycatcher *Muscicapa striata* (Sellers 1985) and Wood Warbler *Phylloscopus sibilitrix* (Sellers 1985);
- non-breeding season distribution: Cormorant *Phalacrocorax carbo* (Sellers 1985), Rock Pipit *Anthus petrosus* (Sellers 1995), Siskin *Carduelis spinus* (Sellers 1989), Snow Bunting *Plectrophenax nivalis* (Sellers 1992).

Most bird recording in Gloucestershire has been done in a non-systematic way, with a disproportionate number of records coming from a relatively select group of species, and often from relatively few, well worked sites. As a counterbalance the GNS has long recognised that more systematic surveys are also needed. In general this has been achieved by supporting national surveys, for instance those organised by the BTO, and encouraging publication of the Gloucestershire results. The Society has, however, also arranged a small number of specific surveys itself. These include a survey of breeding Meadow Pipits in 1985 (Hamlett & Sellers 1989), and more recently involvement in a cooperative project with GOCC and ornithological organisations from Gwent, Herefordshire, Breconshire and Radnorshire to survey the wintering birds of the R.Wye. Six complete surveys have been successfully completed, providing an invaluable baseline against which future changes in the abundance and distribution of birds can be gauged (Jennings *et al.* 1997). These are excellent examples of what carefully planned surveys can achieve and it is to be hoped that more can be arranged for the future.

Bird recording and the formalities of having certain records scrutinised undoubtedly deters some birdwatchers from sending in details of what they have seen. This is unfortunate, for all records are potentially of value and particulars of sightings are welcome from everyone, even if they refer only to relatively common species. Advice and encouragement on recording is available at the indoor and field meetings referred to above, from the County Bird Recorder or from the Society's officers. The Society's library, currently housed at Hartpury Agricultural College, is also an invaluable source of information for beginner and specialist alike.

Looking finally to the future, further analysis of the bird records is urgently needed, a process which should be aided by the ready availability of electronic means of storing, handling and analysing data. A start has been made on computerising the records, but a great deal more work will be needed before this is complete. To establish some priorities for ornithological and other work the Scientific & Publications Sub-committee have considered what needs to be done and drafted an Action Plan. As concerns birds, the principal aims for the future are seen to be:

- prepare Status Reports on species of high and intermediate conservation concern (a Status Report is a summary of information relating especially to current status, distribution, population trends and conservation needs);
- support national surveys and ensure that Gloucestershire records are written up and made available within the county;
- encourage surveys of specific species; and
- consider carrying out a tetrad breeding survey.

The Society is also cooperating with the Gloucestershire Biodiversity Working Group (1997) to provide information on the status, distribution and population trends of potentially endangered species in the county.

In summary, the Society has laid a good foundation regarding ornithology in the county, but there is no shortage of tasks for the future.

Gloucestershire Biodiversity Working Group, 1997, *A Biodiversity Challenge for Gloucestershire: The Foundation for a Biodiversity Action Plan for the County*, (Report).
Gloucestershire Naturalists' Society, 1996, *Rules of the Society*, para 2.
T.Hamlett and R.M.Sellers, 1989, Breeding status of the Meadow Pipit in Gloucestershire, *The Gloucestershire Naturalist*, 3, 14-20.
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J.D.Sanders and R.M.Sellers, 1989, A new list of Gloucestershire birds, *The Gloucestershire Naturalist*, 3, 1-13.
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R.M.Sellers, 1995, Rock and Water Pipits in Gloucestershire, *The Gloucestershire Naturalist*, 8, 6-11.
C.M.Swaine, 1982, *Birds of Gloucestershire*, (Alan Sutton, Gloucester), p.72.

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THE SEVERN ESTUARY GULL GROUP

M.E.Durham

The Severn Estuary Gull Group was formed in 1988, though like minded individuals had started to ring gulls some two years previously. As the name suggests, the specific objective of the Group was to study the gulls of the Severn Estuary, prompted by the perception that although thousands of birds used the upper Severn roost comparatively little detailed information was known about their behaviour. Although the activities were not to be restricted to ringing, it was clear from the outset that much of the Group's efforts would involve ringing birds at landfill sites, not only in Gloucestershire, but also in Hereford & Worcester. It was decided that the initial target species should be Lesser Black-backed Gull *Larus fuscus*, which was present throughout the year.

Although cannon netting gulls at landfill sites has been the Group's major activity, much additional effort has been put into ringing nestlings in Gloucester and Hereford, gathering field records of colour-marked birds, and undertaking roost counts. The landfill sites at which gulls have been caught are Gloucester, Frampton-on-Severn and Stoke Orchard (all in Gloucestershire), and Throckmorton, Stretton Sugwas and Martley (all in Hereford & Worcester, the latter two now being closed).

With regard to cannon netting, a total of 168 catches have been made in the period 1986-97. These catches resulted in 21,095 birds being caught, of which 996 had already been ringed elsewhere. In addition 711 nestlings have been ringed on roof tops in Gloucester and Hereford. The numbers of fully grown Lesser Black-backed Gulls ringed represent a significant contribution to the UK effort, being about 75% of the national total for the period 1986-95 (the last year for which national figures are available). The ringing of Black-headed Gulls has also been notable, though less significant at around 12% of the national total of full grown birds.

The breakdown of the totals ringed by species is as follows:

Mediterranean Gull *L.melanocephalus*	1	
Black-headed Gull *L.ridibundus*	8294	
Common Gull *L.canus*	40	
Lesser Black-backed Gull *L.fuscus*	9050	(plus 579 nestlings)
Herring Gull *L.argentatus*	710	(plus 35 nestlings)
Great Black-backed Gull *L.marinus*	13	

In many respects, the highlight of ringing activities is the catching of foreign ringed birds, and the recovery of one's own birds from abroad. Tables 1 and 2 below summarise the records reported in the period 1986-97 for Lesser Black-backed

TABLE 1. Summary of SEGG Foreign Lesser Black-backed Gull Recoveries

	SEGG ringed birds recovered abroad	*Foreign ringed birds retrapped by SEGG*
Greenland	1	0
Iceland	14	0
Faeroes	11	4
Norway	5	11
Denmark	2	1
Netherlands	32	14
Belgium	2	2
France	5	0
Spain	4	0
Portugal	10	0
Morocco	6	0
Western Sahara	1	0

TABLE 2. Summary of Foreign Black-headed Gull Recoveries

	SEGG ringed birds recovered abroad	*Foreign ringed birds retrapped by SEGG*
Finland	26	4
Norway	10	4
Sweden	29	4
Baltics	15	22
Russia	4	1
Poland	7	8
Germany	25	1
Denmark	62	13
Netherlands	48	4
Belgium	7	5
France	3	0

Gulls and Black-headed Gulls respectively. The impact of catching full grown Lesser Black-backed Gulls can be gauged from Table 1, with the recovery of many more birds from Iceland, the Faeroes, Norway, Denmark and the Netherlands than previous national statistics would have suggested. The numbers in Table 2 are consistent with previous findings, which indicated that the majority of birds wintering in the Midlands and Bristol Channel region originated from the North Sea coast of Europe, rather than Scandinavia.

The other gull species have generated fewer recoveries, as might be expected from the lower numbers caught. A (Yellow-legged) Herring Gull caught one autumn was found dead in the Dordogne, France, the following winter; and a Common Gull ringed at Gloucester was reported from Karelia, Russia, some 17 months later.

As well as using conventional metal rings, there is increasing use of colour rings to generate additional information on the movements of gulls. Colour rings have been used on a range of gull species across Europe, and the dedicated observer can reap many rewards (see, for instance, article by Sanders elsewhere in this issue - Sanders 1998). It is difficult to provide a succinct summary of these records, there being around 6,000 sightings of over 500 individuals. Many of these individuals were ringed in the UK, but foreign-ringed birds also feature significantly, with Lesser Black-backed Gulls from Iceland, the Faeroes, Norway, the Netherlands and Spain; Herring Gulls from Denmark and Portugal; Black-headed Gulls from Denmark, Spain and France; and Common Gulls from Germany, the Netherlands, Estonia, Denmark and Poland.

The other aspect of fieldwork undertaken by members of the Group is the counting of birds using the Upper Severn roost. Counts were undertaken by the Group twice each winter between 1988 and 1993, and the last being part of the national count organised by the BTO in January 1993. In an attempt to ensure adequate coverage, 10 counting sites between Purton and Arlingham were established, with the objective of counting birds flying into the roost. Various difficulties quickly became apparent, as it was difficult to count birds already at the roost, some birds flew into the roost along the river out of the sight of observers, and many flew in after dark when it was not possible to count them. However, the counts did provide evidence for use of the roost increasing. The first reported count in 1952 (part of the BTO inland roost count) produced around 20,000 birds, mainly Common Gulls. By 1983 the count had risen to 83,000, but the observers believed that over 100,000 were present. The peak count recorded by SEGG was close to 135,000, but again this was recognised as an underestimate and the observers considered that there could be excess of 300,000 birds actually using the roost at peak times.

Further details of the Group's activities in the period 1986-1996 can be found in its recently published first progress report (Stewart 1997).

ACKNOWLEDGEMENTS: Thanks are due to the owners and operators of landfill sites, and to the owners of premises in the cities of Gloucester and Hereford, for allowing access for the Group's activities. The financial support of the Dursley Birdwatching and Preservation Society, the Gloucestershire Wildfowlers Association and Cheltenham Bird Club is also acknowledged.

J.D.Sanders, 1998, Colour-ringed Lesser Black-backed Gulls in Gloucestershire, *The Gloucestershire Naturalist*, 11, 86-99.

P.Stewart, 1997, *The Severn Estuary Gull Group, First Progress Report. A Summary of Ringing Activities 1986-1996*.

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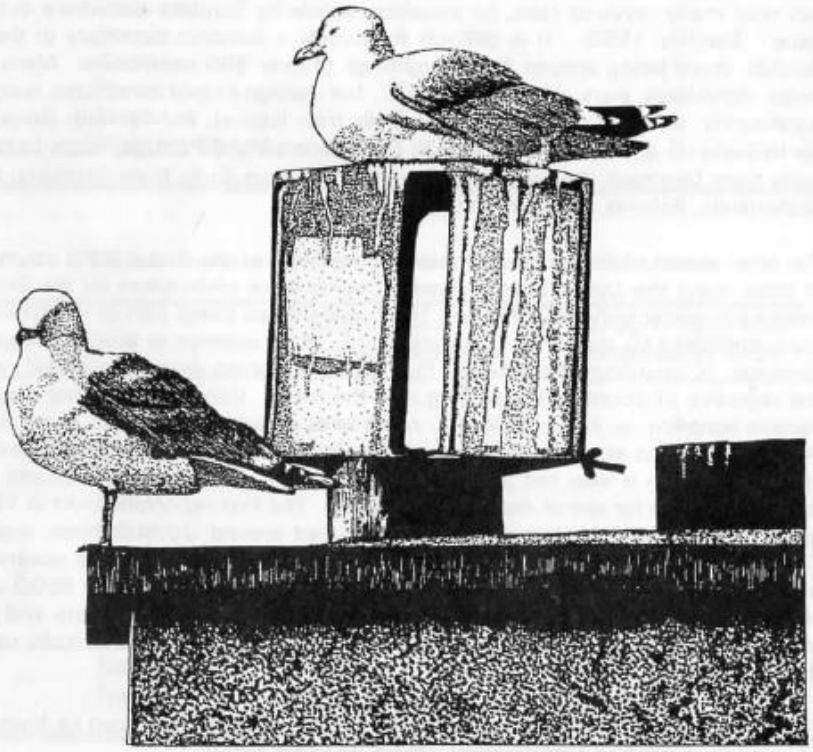


DURSLEY BIRDWATCHING AND PRESERVATION SOCIETY

Maurice Bullen

HISTORICAL NOTES

Early in 1953 an advertisement in the Dursley Gazette resulted in a meeting at Dursley Grammar School at which this Society was founded. The initiative for that gathering was taken by Trevor Walsh, who lived in Dursley and was an enthusiastic ornithologist with contacts among the nationally-known naturalists. He guided and motivated the Society as Honorary Secretary for over 12 years. It is difficult to appreciate now the quite austere conditions of the 1950s - still remaining from the war-time restrictions of the previous decade. The local population was considerably smaller than now, and the housing developments of the last 43 years were then large green areas surrounding a relatively small and long-established nucleus. Birdwatching was becoming an accepted and more popular hobby, but in the early 1950s books on bird identification were few. The "bible" was the 5-volume *Handbook of British Birds*; three months after the inauguration of our Society the County Librarian agreed to provide the complete set in the Dursley library. In 1952 the *Popular Handbook* was published; although more manageable and affordable, it was not a field guide. For that we had to wait until 1954, when the Peterson/Mountfort/Hollom publication was issued. This was a real landmark, and so popular at 25/- that it was published, reprinted and revised in its first year.

Bird song recognition was promoted by recordings broadcast on radio, mainly through the work and delightful commentaries of Ludwig Koch, and later Eric Simms. The first bird song records obtained by the Society were four, costing 5/- (25p) each, and covering 27 species altogether. Colour photography and printing were beginning to bring a new dimension to the study of birds, but it is interesting to recall that, in our early years, the films made by the BTO, RSPB and others were black and white - and also silent.

29 people attended the inaugural meeting. By 1957 there were 55 members, but numbers began to fall in 1967 and by 1970 reached an all-time low of 41. To get out of the doldrums a second, informal, monthly meeting was instituted - and winter field meetings started. This helped, and in March 1975 a membership of 83 was thought to be a record. By 1976 membership had gone through the 100 mark; it has steadily grown ever since, and stands at more than 300 today. In the early days Society members lived mostly in the Dursley area; today they come

from most parts of our county - and from even further afield; our most distant members' home is in Pretoria, South Africa!

Early on, a very modest room-hire charge was paid to Dursley Grammar School; the records note that in 1972 a new rate of 47½p per meeting was charged, to cover the cost of the caretaker. Today's indoor meetings are held at the Community Centre, where we now pay £168 for 13 meetings; this includes kitchen facilities, for in 1989 it was decided to serve tea and coffee at indoor meetings, to give members a chance to chat together after the close of official business.

DBWPS car stickers came into being in 1975. Originally they had a brown Wren and wording on a primrose card; one sticker was issued free to each family. They still continue, but just in black and white. To give the Society the fashionable 'corporate image' it was decided in 1989 to have jumpers and sweatshirts embroidered with the Society's Wren emblem. These have proved very popular and are almost a uniform at Society meetings.

In 1990 the Committee decided to try for charity status - to give credibility to the Society when seeking help, and to enable covenanting of subscriptions to increase our income. It took many months and a few alterations to the constitution, but charitable status was granted in 1991.

SOCIETY MEETINGS

In the Society's early years there were not many private cars, and members arrived at field meetings on foot or bicycle, or by bus. A coach outing to Frampton on Severn in June 1953 cost members 2/- a head, while the 1978 Spring weekend at Exford cost £6.50 a head, plus VAT, for dinner, bed and breakfast. In the Society's archives there is a photograph (taken by Lionel Jones) of a birdwatching outing in June 1955 - a launch trip on the Sharpness canal. Among 20 people, there were just two pairs of binoculars!

Various crises that affected meetings are documented in the minutes: the foot-and-mouth outbreak when no-one was allowed on farmland; the power crisis when public buildings could not be used in the evenings; the near-doubling of petrol prices in 1980, which resulted in attendance at field meetings falling sharply. The papers for the AGM in 1971 were duplicated - but could not be sent to members because of the postal strike.

Field meetings extended progressively beyond the local area to more ambitious destinations as travel problems eased and experience increased, and the first residential weekend (to the Gower) took place in 1961. That has been followed by over 50 expeditions of 2 to 7 days' length, which have ranged over most of Britain - from Kent to Northumberland, Devon to Wales, Cornwall to Scotland.

Between 1961 and 1978 the weekend trips were reasonably close, with mid Wales, south Wales and Exmoor being popular. In 1978 a first venue over 100 miles away (Dee Estuary) was followed by trips to North Norfolk and Suffolk. Bird observatories at Gibraltar Point, Dungeness and Portland were popular; the former was visited in 1984, 1985 and 1989. A landmark was the Society's trip to Holland in 1988, which gave 6 days of excellent bird-watching. The variety of expeditions has steadily increased; for example, 1990 gave members the chance to go on 4 weekend adventures - Spring in Pembrokeshire, Summer in Anglesey, Autumn in Devon and Winter in Norfolk. The Pembroke weekend was perfect, with blue sea and skies. The party divided into 2 groups, alternating between the mainland and Skomer island. The boat trips to Skomer (and to Grassholm to see the teeming Gannets) were enjoyed, as was Skomer itself, with its seabird colonies, Short-eared Owls, Choughs, migrants, flowers and wonderful scenery. The *real* adventure was spending a night on Skomer; thousands of Manx Shearwaters were all around us - an experience everyone will remember.

Today our season for *indoor* meetings runs from early September to end March, with two meetings a month. *Outdoor* meetings happen in every month; a typical year's programme will have about 60 meetings, ranging from a half-day local event to a prolonged expedition. This large number of meetings results in many gatherings being of quite small numbers - which makes for full participation by everyone, with help to new members being on an easy and friendly basis. Though we are proud to retain our historical title, we are not exclusively a 'bird' society - both lectures and field meetings cover a broad range of both flora and fauna.

CONSERVATION

At the Society's 1982 AGM it was suggested that we should try to be more active in conservation by purchasing a reserve. This was not financially possible - so an alternative was to seek an area with which the Society could become involved, with the aim of improving the conservation aspects. After many suggestions the project narrowed down to an area of great beauty and possibility - at Newark Park, near Wotton-under-Edge. The house and grounds were given to the National Trust in 1949; then, after a period as an old people's home, Newark became the home of Mr Robert Parsons, who tackled the restoration of the house and grounds. With an overgrown lake (one could walk across!), woodland and parkland with mature trees, the area was ideal for birdwatching and developing conservation. With Mr Parsons' encouragement, the Society began clearing the lake, putting up nest boxes and planting suitable shrubs and trees. The first couple of years saw members working on the lake to clear away 30 years of accumulated vegetation, dig out silt, create open water - and enjoy the challenge. A Hy-Mac was hired for a week to finish the job; areas of bog-bean and rushes were planned, islands were made and banks shored up. Today there is a pleasant lake, with birds such as Moorhen, Mallard, Mandarin, Heron and Kingfisher; it is also a spawning area for frogs, newts and toads.

The woodland abounds with birds, and Newark was the first site for the Society to install a substantial number of nest boxes. Monitoring of the use of those nest boxes was at first somewhat *ad hoc*, but in recent years we have greatly expanded our nest box programme. Today there are several hundred nest boxes in six sites - Newark Park, Warren Woods, Berkeley Heath Farm, Three Groves Wood, Penn Wood and Westonbirt. Each of those sites has a designated Organiser, and a rota of Society members ensures that every box is checked at two-week intervals throughout the breeding season. The Organisers transfer all observations to BTO nest record cards.

There are other conservation activities besides the nest box work; we have tried our hand at hide building in two locations (and are looking forward to a third), and we support every possible BTO field survey by arranging for volunteers from the membership to make appropriate observations in our area. Besides those surveys, we have agreed to be responsible for an on-going year-round survey of general wildlife at Berkeley Heath Farm, as the diversification of this site develops.

To return to Newark, the Society owes much to Mr Parsons; for many years while he lived at Newark he allowed us to hold an open day in Spring - always a busy and happy occasion. The proceeds from this support the wildlife conservation projects which the Society elects to help.

FUND RAISING

The Society's financial policy is to keep subscriptions modest, providing that that income covers the routine activities of the Society - costs of speakers and venues, insurance, monthly Bulletins, postage and so on. Money to support other conservation bodies or projects is raised by other activities. This began many years ago with the RSPB Caledonian Pine Forest Appeal; donors of £500 would have their name recorded on a plaque on site. We decided to try to get this sum, as many members enjoyed bird watching in this superb area and appreciated the need to preserve it. Many functions were held - it was the beginning of Open Gardens which have been held every year since; there were raffles and sales, and we raised the £500. The next year the Woodland Trust was chosen, and £500 given. The presentation fell through, though; the infamous hurricane happened - and their representative was fully occupied elsewhere. The Society has always had close ties with The Wildfowl and Wetlands Trust, so we helped with funds for the new centre at Llanelli. We have, of course, given similar help to our County Wildlife Trust, and from time to time money has been given for specific projects to RSPB, the Woodland Trust, Wildlife Trusts of other counties, and other bodies. All this is in addition to the annual sums we pay to various conservation bodies in affiliation fees, and to the annual grants which we make to GOCC, SEGG, SVRG, and LIPU - amongst others.

This money is raised in a variety of ways. Everything from melamine to handknits,

bird feeders to greetings cards, and much in between has been sold. We have had stalls at the Community Association Christmas Bazaar, Frampton Country Sports Fair, Slimbridge evenings, and Newark Park. There have been a number of 'theme' social evenings. We have auctioned two paintings, and raffled books, engraved glass and wildlife photographs. Many people have been involved in these varied activities.

GARDEN BIRD FEEDING SURVEY

This, perhaps, deserves special mention. It was initiated by Nevil Lusmore in the autumn of 1978, with a 17-week observation period in which 10 members participated, recording the maximum number (in each week) of each species of bird feeding on food provided in the garden. It has continued in every subsequent year, and during the 17 winters it has been a successful and growing project as new members join. Observations have been made in 50 gardens, totalling well over 6,000 Observer-Weeks (O-W), recording an average of 40.1 birds/O-W; all from the comfort of a warm home. This makes the birdwatcher's garden a wildlife refuge of considerable importance; 63 species have been seen feeding. The number of birds feeding each winter varies considerably; it has been as low as 31.9 birds/O-W during the winter of 82/83, and as high as 47.6 birds/O-W in 81/82, when there were prolonged cold spells. The factors affecting the bird numbers attracted to our gardens during the winter months may include the severity of weather, the lack of available food in the wild, the success of the previous breeding season - and possible long-term increases or declines in certain species.

Garden bird feeding can be encouraged by the availablilty of high quality bird food at attractive prices. We buy in bulk (over two tonnes each year) and the stock is held, and distributed to members as required, by a volunteer. We are very grateful to Gerry Hadley for doing this for many years, and to Chris Goatman who has taken over in recent years. It is a great service - both to members, and to the birds!

SPECIES RECORD CARDS

Since the earliest days of the Society, members have recorded some of their observations on the Society's official record cards. Each month's new cards are sent to the Bulletin Editor, who includes the salient information in his next issue as 'Unauthenticated Records'. Details are passed to the County Bird Recorder, or to the BTO, or both. When the report is of an unusual species, or a species with unusual timing or habitat, the card is sent to the Society's Rarities Committee for validation. The collection of four decades' worth of these monthly records is a substantial data-bank - but any analysis would be an almost impossibly substantial task. From 1953 the 'official' DBPS area (from which records were collected) was a circle of 16 km radius from Dursley, but in 1980 this was enlarged to cover 16

defined 10 km squares, both to accord with BTO census methods and boundaries, and to reflect the widening area of the Society's membership. Between 1953 and 1973 a total of 193 species was recorded; by 1992 this had risen to 237.

SOCIETY BULLETIN

From the outset the Society has had a regular Bulletin; the early ones were produced by Trevor Walsh and put into Dursley Library for members to read. He continued until 1966, when Nevil Lusmore took over until 1972. Gerry Hadley then took on the job, and has been Bulletin Editor ever since - a splendid service to the Society. Each month's issue has details of coming meetings, reports of recent indoor and field meetings, and observations from species record cards. From time to time a member will provide an article describing a notable wildlife holiday, or trip to an exotic destination. Every member receives a copy of the monthly Bulletin - either by post, or from a local area distributor.

SOCIETY LIBRARY

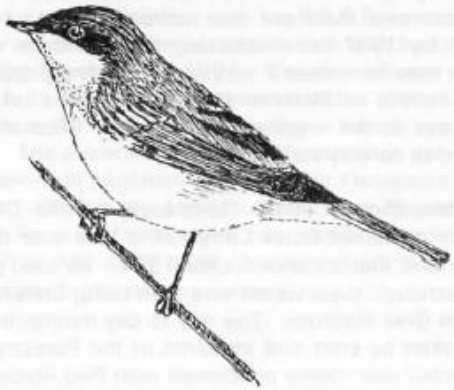
For many years we have had a library, which grows steadily. The Society's Librarian is given an annual budget to buy appropriate books, and there are periodic donations of books, or money from special sources. Volumes in the 'Where to Watch . . . ' series are very popular, as members travel increasingly throughout the UK, and abroad. When the 'Teach Yourself Bird Sounds' series of cassettes was launched, it was decided to have the whole set in our library, to encourage members' skills in recognising bird songs and calls. A recent, and popular, development has been to stock an increasing range of wildlife videos; some of these are bought from the Library budget, while others are donated. A token charge for borrowing a video helps to build up funds to acquire more.

SOCIETY ETHOS

This can be stated, informally, very simply. We aim to be an active, friendly group of people to whom the enjoyment and conservation of wildlife and our environment is important. We aim to give our members an unrivalled programme of indoor and field meetings - for a modest subscription. We aim to live up to the 'Preservation' in our title by taking part extensively in as many BTO field surveys as possible, and by raising funds every year to support chosen conservation project(s) and organisations. And we aim to enjoy our wildlife, and impart that enjoyment to others.

ACKNOWLEDGEMENTS: I have enlarged my own thoughts by drawing on Society records, and on the recollections and writings of various other members of Dursley Birdwatching and Preservation Society - Frank Adams, Brian Bailey, Kathy Bullen, David Emery, Nevil Lusmore, Lionel Jones, Mike Robinson - and probably others whom I have forgotten. I am very grateful to them all.

M.Bullen, Hon. Secretary, Dursley Birdwatching and Preservation Society, c/o 20 South Street, Uley, Dursley, Glos GL11 5SP



NAGSHEAD - AN EXERCISE IN CONSERVATION

Frank A. Lander

The area around Nagshead near Parkend in the Forest of Dean first came to the notice of the ornithological public when, in 1942, members of the Forestry Commission put up 84 nest boxes prior to the commencement of the breeding season. To their surprise 15 of these boxes became occupied by Pied Flycatchers *Ficedula hypoleuca* and therefore the number of nest boxes was gradually increased to 110 by 1947 but monitoring visits to them were sporadic. It is believed that there may have been a very small breeding population of this species in the area prior to this as Mellersh (1902) comments on occasional breeding records, but always in the west of the county. Witchell & Strugnell (1892) regarded this species as very rare.

A major change came about in 1948, David Lack, the then Director of the Edward Grey Institute in Oxford asked Bruce Campbell to take over the supervision of the nest box scheme and this continued until 1964. He also produced reports for 1965 and 1966 although supervision was then being undertaken by Peter Evans also of the Edward Grey Institute. The day to day monitoring over this period of time was undertaken by staff and students of the Forestry School in Parkend. Whilst Bruce Campbell was mainly concerned with Pied Flycatchers and Redstarts *Phoenicurus phoenicurus*, other traditional hole nesting species were already taking advantage of the boxes. Whilst in general there has been very little variation in the numbers of species since the early days, there has been a very large increase in the number of Blue Tits *Parus caeruleus*.

The involvement of Peter Evans finished at the end of the 1967 nesting season, after which time the monitoring was undertaken by John Niles and Steve Cooper both of whom had been actively concerned with the scheme. After prolonged negotiations an agreement was signed on 25 November 1973 between the Forestry Commission and the Royal Society for the Protection of Birds for 378 acres at the Nagshead Plantation to become a nature reserve for a term of 21 years.

RECENT TIMES

The first R.S.P.B. Summer warden arrived in 1975 at which time the Forestry Commission provided a car park and handed over a small building for use as a reception centre. The warden's accommodation was a caravan, basic in the

extreme, without even having running water. A "new" caravan was provided in March 1981 following an invasion of the original one by Yellow-necked Mice *Apodemus flavicollis* the preceding September, forcing a hasty withdrawal of the summer warden who was still in residence. This latter caravan was ceremonially burnt in 1989. 1981 also saw the arrival of Malcolm Stott as the first full time warden for the whole of the Forest of Dean and it was in 1982 that he found that Peregrines *Falco peregrinus* were nesting at Symonds Yat. The following year brought about a further development with the construction of the Campbell hide by apprentices from the Chepstow Army Apprentices College, in front of which members of the Forestry Commission dug out a pond. This was sited to collect water from a stream running from higher up the hillside, but except in very wet conditions, this stream has now dried up.

Malcolm Stott moved to another position with the R.S.P.B. towards the end of that year to be replaced by Ian Bullock who was to remain until he took up a two year position on Aride in the Seychelles in 1987. The main change during his stay in the Dean was, in 1985, to oversee the extension of the reserve from the original 378 to 761 acres for a 40 year term following a further agreement with the Forestry Commission. The present warden Ivan Proctor took over from Ian Bullock and now has the reserve at Highnam and also the Peregrines at Symonds Yat under his jurisdiction. During the period of time that Nagshead has been an R.S.P.B. reserve, the Forestry Commission has continued to carry out a limited amount of work. This has been done in conjunction with the warden and restricted to periods outside the nesting season.

MANAGEMENT

The provision of nest boxes has played an important part in the bird population of Nagshead and over the years several sizes and designs have been tested. One of the earliest experiments, covering the period from 1949-1964, was to put two boxes on the same tree. Not surprisingly, perhaps, it was found that the take up rate of these 'doubles' was less than boxes on their own and the experiment was then discontinued. In 1980 and 1981 all boxes were renewed and standardised to the normal hole nesting design, utilising the plentiful supply of timber which had become available due to Dutch elm diseased trees. This change led to the almost total eradication of Redstarts as a nest box breeding species. Since that time four different styles or dimensions of boxes have been tried to encourage an increase in their utilisation. These changes have met with a very limited success, the ideal box has not yet been produced for this species. Visitors to the reserve during the period from September to mid-April may well notice that the entrance holes of the nest boxes are blocked. The reason for this is twofold, firstly it stops mice, mainly Wood Mice *Apodemus sylvaticus* from using boxes to live in during the Winter months or store acorns. This ploy lessens the habit of these able climbers from ascending trees in the nesting season when they would predate either the eggs or nestlings. The second reason for blocking the holes of nestboxes is to prevent

Blue and Great Tits *P.major* from starting to build nests prior to the arrival of Pied Flycatchers and Redstarts. In a mild spring, tits can be seen prospecting for nest sites in February whilst building can commence any time after the middle of March. The earliest arrival date for a male flycatcher is 5 April, whilst females usually arrive a week later by which time Blue Tits in particular may well have laid a full clutch of eggs. The blocking of holes was first reported for the years 1958 and 1959 and again in 1964, however the practice was then discontinued until 1983 when 40 boxes were blocked. This action was precipitated by the ever increasing number of breeding Blue Tits. Whilst there are reports of Pied Flycatchers having a somewhat aggressive nature, it has not been proved to be sufficient to oust another species from an already occupied nest box. Indeed, dead Pied Flycatchers have been found in boxes with evidence of fighting having taken place. The number of breeding pairs of Blue Tits has now increased to over 50% of all nest boxes and the continuation of their blocking is now perceived to be a matter of routine. The total number of nest boxes is now in excess of 400 with an occupancy rate generally in excess of 90%.

The records relating to the birds breeding the nest boxes can be placed into four periods:

1942-1947	Forestry Commission Staff
1948-1964	Bruce Campbell
1965-1974	Bruce Campbell's assistants
1975-present	R.S.P.B. staff and volunteers.

OBSERVATIONS

Whilst all nest boxes are checked weekly and details recorded on British Trust for Ornithology nest records cards, it is the Pied Flycatcher and Redstart populations which have received the most intensive study since the advent of Bruce Campbell in 1948. One of the difficulties in the analysis of other people's data is the problem of deciding to precisely what each figure refers. This is particularly relevant to the stated number of pairs prior to 1978. A breeding pair which looses a first clutch and relays, can easily be recorded as two pairs. Equally, there has been a tendency in the past to regard late breeding attempts as second clutches rather than a relay. Neither of these cases can be proved unless the female is caught on every occasion. Lack refers to a very few second broods of flycatchers after successful first broods during the period 1948-1964. In my experience there has only been one certain attempt in the period 1981-1996 within the reserve. There is a possibility of a second occurrence when a female, known to have nested earlier in the season and elsewhere in the Dean, successfully reared four young. The doubt arises due to the fact that a number of dead young were found in her original nest and it is uncertain whether any young actually fledged which is the criteria utilised. In this discussion, therefore, figures of breeding pairs of flycatchers in boxes are taken as absolute minima and these are shown in Figure 1.

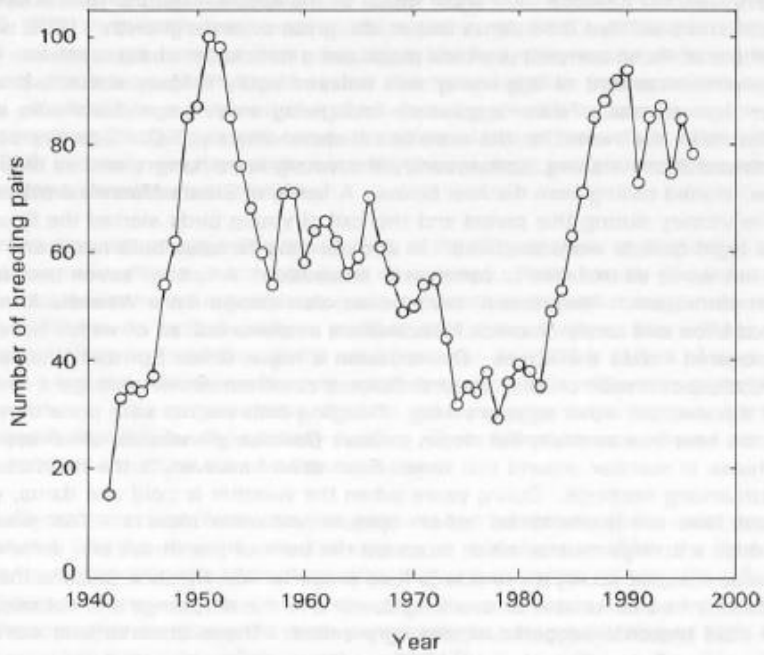


FIGURE 1. Number of pairs of Pied Flycatchers breeding at Nagshead 1942-1996

It will be seen that following the peak number of 100 in 1951 there was a steady decline in numbers until 1978 when there were only 29 pairs on the reserve. It is believed that an increasing shrub layer of bramble, holly and horse chestnut was at least partly responsible for this decline, together with the ever increasing numbers of the tit family.

Management work by the Forestry Commission helped to open up clearings in the original section which had been enclosed during the winter of 1947-1948, whilst a further 40 nestboxes were put up in the grazed part of the reserve in the Winter of 1981 so that by 1983 numbers of flycatchers were beginning to rise. This increase continued until 1990 since which time numbers have fluctuated within fairly narrow limits. It is believed that poor weather conditions during April and early May have a great effect on the overall success of a breeding season. Cold wet conditions mean that females take longer to attain breeding condition and

certainly in some years it has a most disastrous effect on the caterpillar population. Heavy rain, for example, will wash much of the species' natural food supply out of the trees so that it becomes lost in the grass or undergrowth. 1996 was an example of these conditions which produced a noticeable chain reaction. Firstly the commencement of egg laying was delayed until 16 May, about two weeks later than normal. Fewer eggs were laid giving an average clutch size of 6.1 rather than the norm for the reserve of approximately 7.0. Scarcity of food continued after hatching, consequently the young were hungry and as they grew older, started calling from the nest boxes. A family of Stoats *Mustela erminea* was in the vicinity during this period and the call of young birds alerted the Stoats so that eight broods were predated. In addition four females built nests and either did not lay at all or failed to commence incubation. A further seven broods died from starvation. Predation of nest boxes also comes from Weasels *M.nivalis*, Wood Mice and rarely Dormice *Muscardinus avellanarius*, all of which have been discovered inside the boxes. On occasion a rogue Great Spotted Woodpecker *Dendrocopos major* or Grey Squirrel *Sciurus carolinensis* will damage a nest box and then extract either eggs or young. Fledgling birds are not safe once they have left the nest box as many fall victim to Jays *Garrulus glandarius* which appear to increase in number around that time. Starvation however, is the main cause of death among nestlings. During years when the weather is cold and damp, young flycatchers are prone to be fed on spiders and other insects. This seems to produce a stringy mucus which clogs up the back of the throat and deforms the beak so that the young are unable to feed properly. On these occasions the adult birds seem either unable or unwilling to remove the droppings and subsequently the nest material becomes increasingly soiled. These observations were first noticed by Bruce Campbell in 1948 and have been recorded during several subsequent breeding seasons. Deformation of the beak and the loss of condition of the young occurs quickly and although the mucus can be removed, only one bird has been known to return to breed the following year after having received this treatment. The deformed beak was still apparent.

Food supply is one of the main keys in the survival and breeding success of birds. The Forest of Dean is no exception to this rule and Nagshead in particular, with its artificially high breeding populations due to the nestbox scheme is, perhaps, even more susceptible to these fluctuations. In a good year caterpillars of the oak roller moth *Tortrix viridana* will defoliate many of the oak trees providing abundant nourishment for nestlings so that fledging of most of the hole nesting species takes in the region of 14-15 days, although Redstarts develop more quickly. In a year with less than ample food supplies, fledging may be delayed for at least two days. In the un-natural situation seen at Nagshead it has been thought appropriate to give nature a helping hand on occasion. Male Pied Flycatchers have been known to have polygamous traits for a long time, sometimes they divide their time between their mates whilst on other occasions the subsidiary female is left to her own devices to rear the young. On these occasions a very close watch is kept on the growth of the young and if the female appears to be having difficulty in

obtaining sufficient food, two or three of the smaller chicks may be transferred to another box where a pair are feeding a lesser number of young. During the years 1992-1995 an infertile male was on the reserve. He had a different mate each year and although none of their own eggs hatched, they made excellent foster parents and it was gratifying to record the return of their young in subsequent years. It should be mentioned that some females are able to rear young on their own, however, fledging usually takes an additional two or three days. Remarkably in 1986 a female was regularly seen to drive a male away from her nest box preferring to feed her young alone.

An interesting aspect regarding the studies of Pied Flycatchers at Nagshead is the behaviour seen after a clutch has been abandoned. If the female chooses to lay again and builds in an adjacent box, she retains her original mate, on the other hand if she moves further away to another part of the reserve, she will pair with the male already in residence in the new territory. In 1993 a clutch of eggs was predated and the female moved into another territory but still within sight of the original box. The original male tried to take over the new territory but was continually repelled by the territory holder. These skirmishes continued until the eggs hatched at which time he left the scene.

Pied Flycatchers and Redstarts are remarkably faithful to their natal area at Nagshead. Whilst there is a limited degree of interchange within the Forest of Dean itself and also the immediate Wye Valley area, birds coming from further afield are much more unusual. Over the past six years only twelve of these have been recorded whilst during the same period only four Nagshead ringed birds have been recorded from other areas in later years. The main areas of interchange are those around Ludlow and Church Stretton on the Welsh border. The Wyre Forest may be an extension of this particular area. Other sites appear to be around Malvern and to the north and west of Hereford a region which seems to be producing an increased number of records. The number of Redstarts recorded on the reserve are much fewer due to the fact that they are far more likely to utilise natural sites, nevertheless no outsiders have been noted. In 1990 there were two cases of polygamy out of seven Redstart nests and one of the males was also polygamous in 1991 and 1992. Records from 1942 to 1964 show the number of pairs of Redstarts fluctuating between one and nineteen. No details are available after that date until 1982 by which time breeding in nest boxes became sporadic for several years. Numbers appeared to increase a little as the boxes became more worn and one possible reason is a liking for oval holes. It is most noticeable, however, that they prefer the more open habitat in the middle and lower regions of the reserve. No Redstart has utilised a nestbox in the ungrazed section of the reserve since at least 1981 and only two are known to have utilised natural nest sites during the same period. In neither case was fledging proved.

Whilst, traditionally, the nestbox scheme has received the most attention, monitoring of other species has also been carried out. The nursery was cleared

by the Forestry Commission in 1986 and the area changed to grass with patches of bramble to encourage warblers. Garden Warblers *Sylvia borin* have adopted this habitat whilst Blackcap *S.atricapilla* and Wood Warbler *Phylloscopus sibilatrix* continue to inhabit the ungrazed areas. They do not appear to have traditional sites and alter their territories to coincide with changes in the vegetation and undergrowth. Over the years Chiffchaff *P.collybita* have steadily increased in numbers whilst Willow Warbler *P.trochilus* have decreased quite considerably. Surveys of these micro-habitats have been a feature of the reserve over the years together with the recording of both dragonflies and butterflies. The success of Nagshead as a nature reserve is the realisation that each aspect of it is part of a whole eco-system and should be monitored and treated accordingly.

In his autobiography, Bruce Campbell recorded his delight that Nagshead, in the heartland of the Forest of Dean, was reasonably safe now that it had become an R.S.P.B. reserve. He also expressed pleasure in the fact that the nest box scheme had been enlarged. I believe he would have experienced even greater satisfaction now that the term of the agreement between the Forestry Commission and the R.S.P.B. has been extended, together with the continuing presence of a full time warden in the area to look after the natural history of this unique site, to which he himself devoted so much of his attention.

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F.A.Lander, 'Brendon', Woolaston Common, Lydney, Glos GL15 6NY

BIRD LIFE IN A COUNTRY PARISH

Roy Hunter

Hardwicke lies just off the A38 some 4 miles from Gloucester city centre. Open country exists to the south, east and west. Moving here in 1984, I looked around for a new project having just completed 11 years on the BTO Common Birds Census on Robinswood Hill. A couple of preliminary walks round the village gave me the idea of recording its wildlife over a period of years. The village itself is reasonably compact, with green open spaces and in the older part the houses have good size gardens which attract a variety of wildlife. The Gloucester-Sharpness canal runs through the parish and provides a varied habitat for the flora and fauna. Most of the land is farmed in the traditional small field manner with hedgerows and patches of woodland; Fishers Wood, Stockpit Wood and the wooded area around Hardwicke Court.

The bird life provides year round interest and to date some 99 species have been recorded. Little Grebes are frequent winter visitors and the odd Great Crested Grebe has been recorded twice on brief visits; Grey Herons can be seen regularly. The winter brings some geese, mainly Greylag Geese, and Bewick's Swans can be seen and heard flying to and from Slimbridge. The resident ducks are Mallard and Mandarin but few broods are reared owing to the numerous mink which infest the canal banks. Sparrowhawk, Buzzard and Kestrel are our main raptors, but Hobby, Peregrine and an unconfirmed Osprey have been recorded.

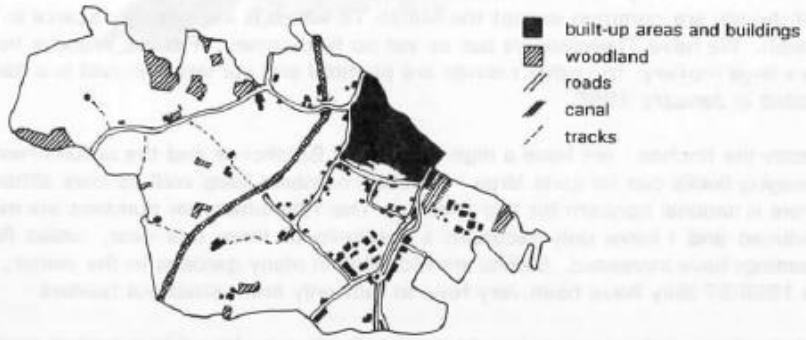

FIGURE 1. Map of the parish of Hardwicke

Sadly neither Red-legged nor Grey Partridges have been seem for some years which reflects the national decline of these species. We have also Quail in Quail years. Common and Green Sandpipers are regular on passage whilst Curlew and Lapwing are flyover species. Common and Little Tern have been noted on return passage in the autumn. Another vanishing species is the Turtle Dove which used to favour the area round Southfield Farm but I have not seen one in the last three years. The Little Owl is common; less common is the Tawny Owl and I have just one record of Barn Owl. Kingfishers breed successfully and sometimes are thrice brooded. All three woodpeckers can be found.

Of pipits and wagtails, the Meadow Pipit is the only pipit so far and these in the winter only. The Pied Wagtail is a common resident, the Grey less so and Yellow Wagtails only on autumn passage. We used to have Nightingales, three of them, but they too have disappeared. One Redstart was recorded close to one of the village ponds in the autumn of 1995. The onset of autumn brings Redwings and Fieldfares which find a ready supply of food on the fallen fruit in the old orchards. The Song Thrush population has dropped alarmingly and I now record every one I see or hear.

The warbler family are my main interest and we have eight regular species. The Willow Warbler comes out on top with an average of 14 singing males on the two mile stretch of the canal that I monitor, closely followed by Chiffchaff - average 10 singing males. Coming up to the fore now is the Common Whitethroat which has made great headway since the disaster in 1969. The 1996 breeding season has been particularly good. Blackcaps average around 4 singing males, Lesser Whitethroat 3. I have only one record of Garden Warbler and this year no record of Grasshopper or Sedge Warbler. Until 10 July 1996 I had not recorded Reed Warbler, but one was singing from some canal bank scrub near Southfield Farm that morning.

All the tits are common except the Marsh Tit which is exceedingly scarce in the parish. We have Treecreepers but as yet no Nuthatches. Fishers Wood is home to a large rookery; the other corvids are plentiful and our latest corvid is a Raven added in January 1996.

Lastly the finches - we have a high number of Goldfiches and the autumn/winter foraging flocks can be quite large. Bullfinch numbers keep well up here although there is national concern for this species. The Yellowhammer numbers are much reduced and I have only recorded a maximim of three this year, whilst Reed Buntings have increased. Siskins are recorded in many gardens in the winter, but in 1996/97 they have been very few, in fact only one visited our feeders.

I hope this article gives an insight as to what can be found in a typical country parish, a project which provides me with interest through the seasons and with new species being added each year - Raven being the latest. I feel sure that other,

similar parishes could provide the basis for an equally interesting wildlife study.

J.R.Hunter, 2 Cornfield Drive, Hardwicke, Gloucester GL2 4QJ

APPENDIX 1. List of Birds Recorded in the Parish of Hardwicke

Little Grebe	Infrequent visitor, mainly in winter
Great Crested Grebe	Three records only
Cormorant	Regular throughout the year in small numbers
Grey Heron	Present all year; post breeding maximum of up to 5
Mute Swan	Present all year
Bewick's Swan	A fly-over species during the winter
Greylag Goose	Recorded irregularly
Shelduck	Record in small numbers in most years
Mandarin	Resident; breeds, but extensive losses to Mink
Tufted Duck	A single record only
Red-breasted Merganser	A single record only
Sparrowhawk	Possibly the most common raptor in the parish and an increasingly common visitor to bird tables in the village
Buzzard	Often circling over the Hardwicke Court area, possibly breeding near Edge Common
Kestrel	Declining; about 4 pairs currently in the parish
Hobby	Rare visitor mainly on autumn passage
Peregrine	Recorded occasionally
Red-legged Partridge	Now quite rare; not recorded during the past three years
Grey Partridge	Also now quite rare; not recorded during the past three years
Quail	Recorded in "Quail" years
Pheasant	Very common
Moorhen	Common breeder, but few young survive the depredations of Mink
Coot	A single record only
Lapwing	No breeding records and mainly a fly-over species post breeding, sometimes in large numbers
Snipe	Uncommon; found mainly in winter along ditches in the village
Curlew	A fly-over species in small numbers
Greenshank	Just two autumn records
Green Sandpiper	Regular each year on autumn passage in small numbers
Common Sandpiper	Regular passage migrant in Spring and autumn
Black-headed Gull	Common on the canal throughout the year
Common Gull	A small winter flock feeds on the playing field
Lesser Black-backed Gull	Mainly flying over to evening roosts on the Severn
Herring Gull	Another species mainly seen flying over to evening roosts on the Severn
Glaucous Gull	A single winter record among other gulls

Common Tern	An autumn passage migrant only
Little Tern	Two autumn records only
Stock Dove	Breeds in small numbers
Woodpigeon	Very common
Collared Dove	Very common
Turtle Dove	In severe decline; none recorded in the last two years
Cuckoo	Small numbers each year but less common recently
Barn Owl	A single winter record
Little Owl	The most frequent owl, especially in the Southfield Farm/Laynes Farm areas
Tawny Owl	Uncommon now despite some night time searching!
Swift	Fewer numbers during the breeding season but huge numbers build up over the canal during the return
Kingfisher	A regular breeder along the canal, estimated at 3 pairs
Green Woodpecker	All year round resident
Great Spotted Woodpecker	Common in the parish
Lesser Spotted Woodpecker	Probably only 2 pairs but difficult to census; 1996 was a good year for the species
Skylark	Still quite numerous over the fields
Sand Martin	Spring passage migrant and, in smaller numbers, in the autumn too
Swallow	Far less common than previously
House Martin	Good numbers still breeding in the parish
Meadow Pipit	An autumn/winter visitor only
Yellow Wagtail	Seen mainly on autumn passage in fair numbers and quite late into the season
Grey Wagtail	Present in small numbers
Pied Wagtail	Common, more so in winter when the resident birds are augmented by birds from elsewhere
Wren	Possibly the commonest bird in the parish
Dunnock	Very common
Robin	Very common
Nightingale	There used to be three very regular visitors but no records during the last two years
Redstart	Just one autumn record by the village green
Blackbird	Very common
Fieldfare	Winter visitor in large numbers
Song Thrush	Sadly a declining species; a rare visitor to our gardens nowadays
Redwing	Winter visitor, less numerous than Fieldfare
Mistle Thrush	Resident in small numbers
Grasshopper Warbler	Never more than two reeling males but no record in 1996
Sedge Warbler	Previously up to nine singing males but only two in

	1996 and none at all in 1997
Reed Warbler	A single singing male on 10 July 1996
Lesser Whitethroat	Regular summer visitor but no more than four singing males
Whitethroat	After the lean years has made a rapid recovery and near the top of the warbler list
Garden Warbler	Only two records; quite scarce here
Blackcap	Numbers vary from year to year but not all that plentiful
Chiffchaff	A common summer visitor
Willow Warbler	The most common of the warblers in the parish
Goldcrest	Common, especially in the churchyard among the conifers; found with tit parties in winter
Long-tailed Tit	Very common, high breeding density
Marsh Tit	Quite rare in the parish; only two records
Coal Tit	Mainly found in the churchyard and elsewhere where there are conifers; visits bird tables in winter
Blue Tit	Very common
Great Tit	Common
Treecreeper	Resident in suitable habitat in small numbers
Jay	Resident
Magpie	Too many and becoming urbanised
Jackdaw	Very common
Rook	Very common; the Fishers Wood rookery averages around 65 nests per year
Carrion Crow	Very common
Raven	Newly recorded in 1996
Starling	Very common
House Sparrow	Very common
Chaffinch	Very common
Greenfinch	Very common
Goldfinch	Resident; autumn foraging flocks can be quite numerous
Siskin	Regular winter visitor to gardens but far fewer in 1996
Linnet	Fairly common; good winter feeding flocks
Bullfinch	Despite national concern there are still reasonable numbers in the parish
Yellowhammer	Another declining species, a maximum of three singing males and never more than a dozen in the autumn/winter feeding flocks
Reed Bunting	Numbers fairly stable

BIRD SURVEYS AT DUCHY HOME FARM, TETBURY, 1992-1996

John McLellan

In 1990 the British Trust for Ornithology announced its intention to set up a comparative survey between plots of organically and conventionally farmed land to test whether organic farming was more favourable to birds than conventional farming as was often supposed. The Duchy of Cornwall which owns the Home Farm at Tetbury expressed an interest in the survey and offered two plots of its own for inclusion in the survey. Although it was the Duchy's intention that eventually all land on the farm at Tetbury should be organically farmed, in 1991 a significant portion remained unconverted. The plots on offer are respectively at Westonbirt (approximately 40 hectares) to the west of Tetbury and at Tetbury Common (approximately 60 hectares) to the east.

THE PLOTS AND THEIR CROPPING PATTERN

The Westonbirt plot is rectangular and divided into five roughly equal fields, three at the north end and two to the south, separated by mixed hedges of varying ages. On three sides there are mature hedgerows of considerable age containing oak and ash as well as thorn, elder and other less substantial trees. From the south and from the north the plot slopes to the centre where there is a field drain that divides the plot more or less exactly into two. Adjoining the south-east and south-west corners are large copses of mature, mixed woodland.

The plot is fully organic and is devoted to arable crops, mainly cereals with pulses as an alternative, with an underpinning of clover. Part of the plot lies fallow each year. After harvest the plot is grazed by sheep for a period of about two months. In most years the remaining stubbles are left until the late winter. In 1996 the plot was ploughed in autumn and spring sown with a mixed ley of grasses and clover and was ungrazed until cut for hay in mid-July. On three sides, west, south and north, the plot is flanked by permanent pasture. To the north the crop is variable; it has been mainly cereal and/or oil seed rape during the survey period.

The plot at Tetbury Common is roughly semicircular in plan with its base resting upon the A433 road and divided into two more or less equal parts by a minor road. The westerly side has four fields of varying sizes divided by double wooden fences between which have been planted thorn hedges. At the time of writing these are coming to maturity. The easterly side of the plot has three large fields divided by wood and wire fences which have also been newly planted with thorn hedges.

The whole plot is surrounded by drystone walls. It is mostly open and without tree or mature hedge cover except for an isolated group of three large (>40 m) beeches. To the west there is a mature copse at the south-east corner and a larch plantation on the north edge. The easterly boundary is a mature hedgerow of thorn, elder *etc.* but this has largely died back during the survey period and is now very thin.

At the start of the survey period the Tetbury Common plot was devoted to the conventional farming of cereals and in subsequent years a fifth of the plot was laid fallow (set aside) in preparation for conversion to organic. In each year the land remaining in production continued to be devoted to cereals. By 1995 the whole plot was registered as organic farmland and was sown with a mixed grass and clover ley for the pasturage of cattle and sheep. In 1996 the first organic (autumn sown) wheat crop was produced on the western half of the plot whilst the other half remained as pasture but was ungrazed until the hay harvest in mid-July. Like the Westonbirt plot, this one is enclosed on three sides by permanent pasture. The fourth, most easterly side gives on to a large field with a variable cropping pattern.

THE SURVEY METHOD

In the spring and summer of 1992, 1993 and 1994 between April and mid-July each plot was visited six times and all field boundaries mapped for the presence of birds, each registration coded for species and activity. All fields were scrutinised with the same purpose and the larger fields traversed diagonally to ensure that all birds present were registered. In the years 1995 and 1996 the number of visits to each plot was increased to ten, using the same mapping strategy, with two of the visits being in the late evening.

These maps were subsequently transcribed on to separate species maps and were analysed for clusters of registrations indicating territories. This analysis was used to estimate the numbers of bird species present and the numbers of breeding pairs for each species. It also gave an indication of the total numbers of breeding birds present during that season. Additional records were also kept for birds visiting the plot for which there was insufficient or no evidence of breeding.

In the winters of 1992/93 and 1993/94 a visit was made to each plot at the end of each month from September to March. On these occasions, too, all boundaries were patrolled and all fields scrutinised and the total number of birds present recorded by species. The numbers of counts per plot was cut from six to five in 1994/95 and 1995/96, talking place from October to February. In these years the spring survey began earlier than in previous years, in mid-March.

Using these counting methods it has been possible to provide direct comparisons, by numbers of birds and species, between the two plots and in the first three

TABLE 1. Bird Species present and breeding in 1995 and 1996

	1995		*1996*	
	Westonbirt	*Tet Comm*	*Westonbirt*	*Tet Comm*
Sparrowhawk		P	P	P
Buzzard	P	1	P	P
Kestrel	P	P	1	1
Grey Partridge			1	P
Pheasant	1	1	P	2
Herring Gull			P	
Cuckoo	P			P
Green Woodpecker			P	
Great Spotted Woodpecker	1			
Skylark	9	9	12	12
Meadow Pipit		P		
Wren	21	9	11	1
Dunnock	6	2	2	2
Robin	6	5	4	3
Redstart			P	P
Blackbird	8	1	6	3
Song Thrush			2	P
Mistle Thrush	1			
Lesser Whitethroat				P
Whitethroat	1	4	1	5
Garden Warbler			P	P
Blackcap	2	2	4	2
Chiffchaff	1	1	2	2
Willow Warbler	P		P	
Goldcrest	1	1	P	1
Spotted Flycatcher				P
Long-tailed Tit	P	2	P	P
Marsh Tit			P	P
Coal Tit	P	P		1
Blue Tit	9	3	10	3
Great Tit	3	P	4	2
Jay	P			
Magpie	2	P	P	1
Starling			2	P
Chaffinch	15	12	12	12
Greenfinch			P	P
Goldfinch	P		P	P
Linnet	P	2	P	P
Bullfinch			P	P
Yellowhammer	12	7	8	4
Total Territories	99	62	82	57
Total Species Present	26	22	32	33

P indicates species present but showing no evidence of breeding.

TABLE 2. Highest winter counts by species

	1994/95		1995/96	
	Westonbirt	*Tet Comm*	*Westonbirt*	*Tet Comm*
Sparrowhawk	1		1	
Buzzard			1	
Kestrel		2		1
Pheasant		3		2
Black-headed Gull		530		1
Herring Gull		5		5
Lesser Black-backed Gull		11		11
Woodpigeon	216	50	150	9
Great Spotted Woodpecker			1	1
Skylark	5	20	5	1
Meadow Pipit		5		5
Pied Wagtail	1			
Wren	10	7	8	9
Dunnock	3	5	3	4
Robin	8	14	9	4
Blackbird	18	10	13	3
Fieldfare	235	11	235	23
Song Thrush			1	
Redwing	30	2	14	39
Mistle Thrush	4	3	4	3
Goldcrest	10	2	10	3
Long-tailed Tit		13	12	9
Blue Tit	43	24	18	12
Great Tit	10	1	7	1
Treecreeper	1		1	
Jay	1	3	1	
Magpie	2	5	2	1
Rook		68		50
Carrion Crow	15	11	2	4
Starling	150	42	5	80
House Sparrow			5	
Tree Sparrow	1			
Chaffinch	81	7	7	6
Greenfinch	90		1	
Goldfinch	9		3	
Linnet	96			
Bullfinch			2	
Yellowhammer	2	3	5	3

These figures represent the highest counts for each species present during a monthly count from October to February each year.

seasons between these plots and others included in the total survey.

RESULTS

The data from the first three mapping seasons have been subsumed into the data held by the BTO for the whole Organic Farming Survey and are not available in readily transmissible form. However the data from the seasons in 1995 and 1996 are available and Table 1 gives comparative information about the species and numbers holding breeding territories on each of the Duchy plots. Table 2 gives the highest counts for all occurring species in the winters from 1994 onwards.

COMMENT AND CONCLUSION

The completed Organic Farming Survey led to the conclusion that although it was difficult to quantify the advantages to wildlife, on balance it appeared true that wildlife and birds in particular appear to benefit from organic farms, mainly because the structure of farmland on organic farms, smaller fields, more hedgerows *etc.*, provide the habitats where birds flourish (Chamberlain, Wilson & Fuller 1995). Subsequent results from the Duchy farm at Tetbury appear to confirm that it is the structure of the plot rather than the farming method that affects the numbers of species present and their breeding pattern. It is notable that the Westonbirt plot is one third less in size than the Tetbury Common plot and yet it provides roughly one third more breeding territories.

The winter pattern is not so clear. Although having some species in common, each plot appears to harbour quite distinct populations; whereas large finch flocks, Woodpigeons and winter thrushes are to be seen on the Westonbirt plot, the Tetbury Common plot appears to favour gulls and corvids together with open field specialists such as Skylarks and Meadow Pipits. What will be obvious from a study of Table 2 is that populations crashed on both in the winter of 1995/96. For the first time for some years both plots were autumn ploughed in 1995, with the consequence that there were no stubbles available for ground feeding birds.

Although it is dangerous to draw broad conclusions from a fairly narrowly based survey these results do seem to point to the fact that small fields interspersed with mature hedgerows provide ideal habitats for breeding birds whatever the farming methods employed and that autumn ploughing and sowing have significant consequences for wintering bird populations.

A.Chamberlain, J.R.Wilson and R.J.Fuller, 1995, *BTO Research Report* No.154, Part 1.

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BREEDING WADERS ON FARMLAND IN THE SEVERN VALE

John L. Quinn

The Severn Vale between Worcester and Gloucester is a flat and fertile flood plain richly covered with alluvial-clay soils. Historically much of the land was wet permanent pasture with high water tables and was flooded intermittently by the large volumes of water flowing down largely unmodified river systems. Major drainage schemes over the last 150 years have meant that the extent and duration of flooding is now much reduced and wet grassland has become a rare habitat, not just in the Severn Vale, but across Britain and Europe. This trend has continued until recent times. It has been estimated, for example, that in the 1970s alone, about 8,000 hectares of damp grassland was drained annually in England (Carter 1982).

The elimination of wet grasslands has undoubtedly increased agricultural output but has also had a negative impact on wildlife. This is especially true of nesting waders, birds which mostly require wet ground conditions in spring and early summer to nest successfully (*e.g.* Smith 1983, Green 1988). In general terms, land drainage has facilitated the switch from low intensity mixed farming to high intensity specialised farming but the ways in which waders have been affected by these changes are many and complex (*e.g.* O'Connor & Shrubb 1986). Traditionally hay meadows were cut late in the season when most young waders had already fledged. Now hay-making has been largely replaced by silage which is usually cut well before chicks have fledged, many of which are then killed in farm-machinery. Intensive dairy farming has increased grazing pressure to such high levels that our once tussocky, unimproved pastures have now been replaced by over-grazed improved lawns. Other changes include the switch from spring-sown to autumn-sown cereals which has especially affected Lapwing because they favour the bare ground provided by spring-cereals (Shrubb & Lack 1991).

The most recent national breeding bird atlas survey has shown the extent to which waders have declined over the last 30 years in Britain and Ireland (Gibbons *et al.* 1993). Snipe and Redshank have shown especially widespread declines, while Lapwing and Curlew have declined locally in Britain but also widely in Ireland. There is much additional evidence of declining wader populations (*e.g.* Marchant *et al.* 1990, Robins 1987, O'Brien & Smith 1992).

Previous surveys in the Severn Vale have located small numbers of breeding waders on a few sites. Many of these are already Sites of Special Scientific

Interest (SSSIs) on the strength of their value to breeding birds and, or, wet grassland plant communities. Coverage has never been complete, however, and it was recognized that a more comprehensive survey in the catchment was required to ensure all sites presently of value to breeding waders were located. In 1995 the Royal Society for the Protection of Birds (RSPB) and the National Rivers Authority (NRA) funded a survey of farmland and breeding waders in the Severn Vale. This was timed to coincide with the release of the NRA's *River Severn Lower Reaches Catchment Management Plan Consultative Document* (NRA 1995) in which the NRA recognise their obligation under Section 16(1) of the Water Resources Act, 1991, to 'further the conservation and enhancement of natural beauty, flora, fauna....'. The survey was intended to help the NRA fulfill their obligations.

The 'Severn Vale Breeding Wader Survey 1995' was undertaken by The Wildfowl & Wetlands Trust (WWT) between April and June 1995 and the results were presented in two volumes (Quinn 1995). It represents the most comprehensive study of its kind ever undertaken in the Severn Vale and was possible only with the help of a large number of local volunteers. Here this work is summarised and the distribution and abundance of remaining breeding waders and their preferred habitats in the Severn Vale is shown. A comparison of wader abundance now with results from a similar survey in 1982 is also made.

STUDY AREA AND METHODS

The Severn Vale was defined as the area enclosed by Worcester, Ledbury, Sedbury, Dursley, Stroud and Evesham (Figure 1). It included most, if not all, areas where wet grasslands are likely to be found in the county. The Severn Vale also included a short stretch of the River Severn in Worcestershire from Upton to Worcester.

Few sites in the Severn Vale are recognised breeding wader haunts. In addition to these, we surveyed other areas thought to be of potential value to waders based on local topography and historical breeding records. The distribution and area covered (7,014 ha) by the 84 sites surveyed in 1995 is shown in Figure 1. Twenty-six sites were visited three times, 12 twice and 46 once. Most of these were near Tewkesbury and Gloucester. Records of breeding waders from a further 6 sites were received from members of the public, mainly farmers.

A one-day workshop was held at WWT, Slimbridge, in which field techniques were explained and demonstrated to volunteers. Observers visited their sites between one and three times, the exact number depending on the results of the first visit. Of the 80 sites covered, the first visit showed that 46 were obviously not suitable for breeding waders and were not visited again. Sites which had no waders on the first visit but which looked potentially suitable were visited a second time.

FIGURE 1. Distribution and extent of sites surveyed for breeding waders in the Severn Vale (dashed line) in 1995

ESTIMATING NUMBERS OF PAIRS

Observers walked within 100 m of all suitable parts of their site recording the position and behaviour of waders on a field by field basis during each visit. The number of territorial pairs was estimated differently for each of the four main species because of differences in behaviour, as suggested by O'Brien & Smith (1992). Number of pairs was estimated for each species as follows: Lapwing - half of the maximum number of individuals present from mid-April to late-May; Snipe - the maximum number of drumming males between mid-April and late-May, provided birds were seen displaying in May; Curlew - the maximum number of pairs and individual territorial birds seen; Redshank - the mean number of *individuals* recorded between mid-April and late-May.

The density of breeding waders (pairs km^{-2}) was calculated in two ways: using (1) the total area surveyed and (2) only suitable habitat. Suitable habitat was defined separately for each species as follows: for Lapwing, all habitats surveyed apart from autumn-cultivated crops; for Snipe, only grassland, used for pasture or fodder; for Redshank, grassland and saltmarsh; and for Curlew, only grassland. Unless stated otherwise, all densities in the text refer to those estimated for suitable habitat only.

A measure of the significance of numbers of pairs of waders recorded on individual sites was based on the approach taken by Smith (1983) and endorsed by English Nature. A site is said to be nationally, regionally, divisionally or locally important for a species if the number of territorial pairs present exceeds a given threshold for each species. The geographic units of 'region' and 'division' refer to the NRA's 'Severn Trent' and 'River Severn Lower Reaches' functional areas respectively. The latter largely matches our Severn Vale study area.

LAND-USE AND MANAGEMENT

The type of farming practised in each field was recorded. Separating improved, semi-improved and rough/unimproved pasture proved difficult without formal botanical surveys and a knowledge of each field's management history. It was also sometimes difficult to determine whether fields were reserved for silage, hay or later stock grazing, especially on sites visited just once early in the season. These data therefore give an approximate indication of management practices. The approximate percentage of the field covered by 'tussocky' vegetation was also estimated.

Three water-table related variables were also recorded: whether the soil was wet or dry underfoot; the percentage of the field covered in standing water; and the water level in ditches using three categories (< 1/3 m below the level of the field, between 1/3 m and 2/3 m, and > 2/3 m).

RESULTS

TOTAL WADER NUMBERS

A total of 227 pairs of breeding waders was found in 1995 (Table 1). Only 45 of the 90 sites surveyed held any breeding waders. All 115 pairs of Lapwing occurred on just 24 of these and there were 69 pairs of Redshank on 20 sites and 42 pairs of Curlew on 29. Just one drumming Snipe was reported. Wader densities were very low. Even Lapwing occurred in low densities: 1.9 pairs km^{-2}. Densities for the whole of the Severn Vale are of course much lower because the numbers of pairs found in this survey are likely to be close to the total populations in the Severn Vale, particularly for Redshank and Snipe.

TABLE 1. Summary of breeding wader numbers and densities in the Severn Vale in 1995

Species	*Number of pairs*	*Pairs km^{-2} in whole area*	*Pairs km^{-2} in suitable habitat*
Oystercatcher	4	-	-
Lapwing	115	1.6	1.9
Snipe	1	0.0	0.0
Redshank	69	0.9	1.4
Curlew	42	0.5	0.9

TABLE 2. Main sites for breeding Lapwing in the Severn Vale, 1995
(Density refers to pairs km^{-2} on suitable habitat)

Site name	*Area*	*Pairs*	*Density*	*% Total*
New Grounds, Slimbridge	152.0	23	15.1	21.0
Bredon's Hardwicke (East)	150.0	12	9.3	10.9
Bredon's Hardwicke (West)	69.1	11	15.9	10.0
Chaceley Stock	201.5	6	3.1	5.5
Anon	80.4	6	11.0	5.5
Saul Warth	101.3	5	4.9	4.5
Ashmoor Common	48.0	5	20.0	4.5
Longdon Marsh	353.0	5	1.7	4.5
Upham Meadow & Summer Leasow	190.2	4	2.1	3.6
Ashleworth & Hasfield Ham	133.6	4	3.0	3.6
Hayden Farm	69.7	4	5.7	3.6
Aylburton Warth	168.0	4	2.4	3.6
Wick Farm, Lower Apperley	103.3	4	4.5	3.6
Upper Lode	41.5	3	7.2	2.7
Cattle Country	24.3	3	12.4	2.7
Eckington Marshes	110.3	3	2.7	2.7
Mythe Pool	79.4	2	2.5	1.8
Walmore Common	56.5	2	3.5	1.8
Pennsylvania Fields	38.3	2	5.2	1.8
Wibdon, Pillhouse Rocks	50.0	1	2.0	0.9
R. Leadon West, Highleadon Court	47.5	1	2.1	0.9

OYSTERCATCHER

Three pairs of Oystercatchers were found near Slimbridge. The first was at Saul Warth. This pair failed after laying a clutch of four eggs and subsequently two other pairs were found at the New Grounds, Slimbridge. The first confirmed record of Oystercatchers breeding in Gloucestershire was in 1990 at Guscar Rocks (ffrench 1990) so the 1995 records suggest that the Oystercatcher is becoming a more regular breeding bird in Gloucestershire. Another pair was found on the R.Avon at Bredon's Hardwicke (East).

LAPWING

Lapwing were the most abundant breeding wader in the Severn Vale, as they are nationally. Of the 21 sites on which Lapwing occurred (Figure 2), most were near Tewkesbury along the R.Severn, on the R.Avon, and near Slimbridge. Lapwing were largely absent from sites in the Gloucester area. All 21 sites on which Lapwing bred are listed in Table 2. Of the 110 pairs, 85% occurred on the 13 sites that held more than 3 pairs. The WWT reserve at New Grounds, Slimbridge, had twice as many pairs (23) as any other site and accounted for 21% of the total number found. However, two other sites had higher densities than Slimbridge's 15.1 pairs km^{-2}: Ashmoor Common had 20 pairs km^{-2} and Bredon's Hardwicke (West) 15.9 pairs km^{-2}. Much lower densities were recorded at Longdon Marsh (1.7 pairs km^{-2}) and at Wibdon (2.0 pairs km^{-2}).

SNIPE

Only one Snipe was recorded drumming on a site not normally associated with the species, Clifton Meadows in the Severn Corridor. Other sites held Snipe in April but none showed any sign of courtship behaviour and were undoubtedly late migrants. Several sites which have held breeding Snipe in recent years returned nil counts in 1995. The following sites have held drumming Snipe in recent years (ffrench 1990-93): Twyning (Upham) Meadow (1 in 1990); Ashleworth Ham (1 in 1990, 1991 and in 1992). None were recorded in 1993 and data have not yet been published for 1994.

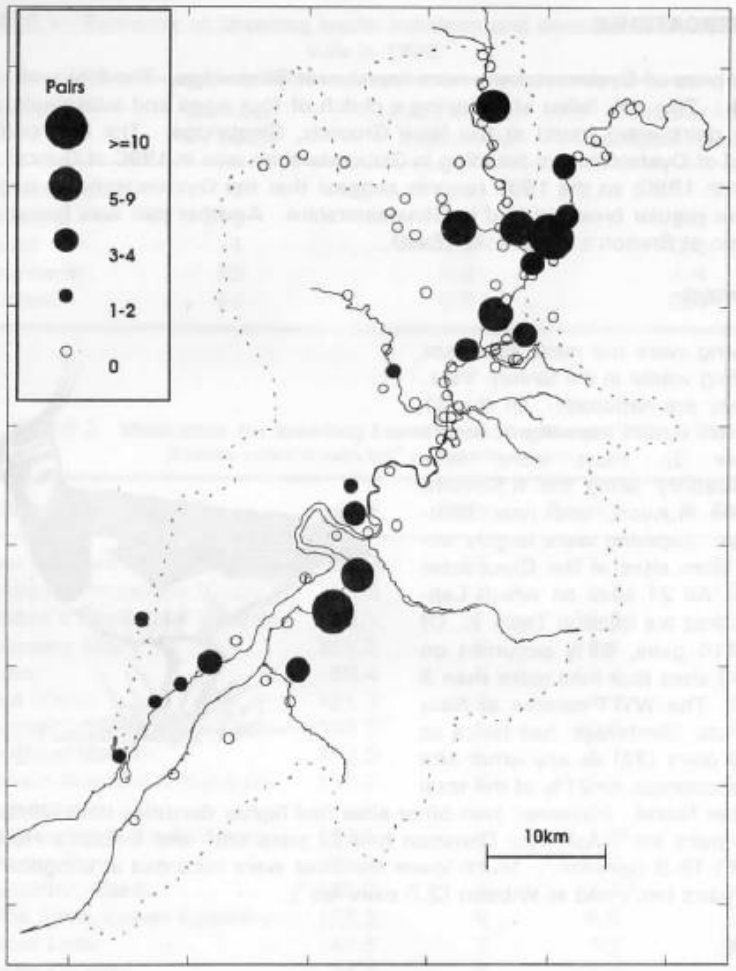


FIGURE 2. The distribution of breeding Lapwings in the Severn Vale in 1995

REDSHANK

The Redshank was the second most numerous species in the catchment but was less widely distributed than Lapwing (Figure 3). Apart from the land on the banks of the Severn estuary and a few sites on the Avon outside the NRA's Lower Reaches division, Redshank were found in very few other localities.

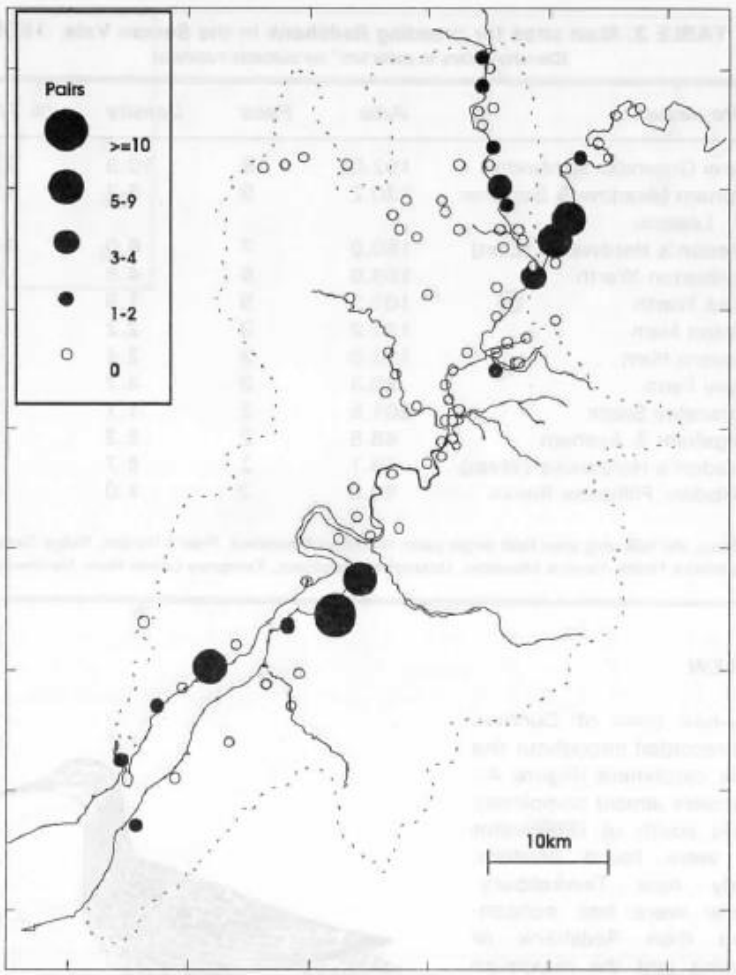


FIGURE 3. The distribution of breeding Redshanks in the Severn Vale in 1995

All 18 sites on which Redshank occurred are listed in Table 3. Just ten sites held more than single pairs and these accounted for 88% of all Redshank. Once again New Grounds, Slimbridge held more pairs than any other site (15), followed by Upham Meadow and Summer Leasow (9 pairs). Slimbridge also had the highest density of Redshank: 10.9 pairs km^{-2} followed by 7.9 pairs km^{-2} on Saul Warth, a site adjacent to Slimbridge.

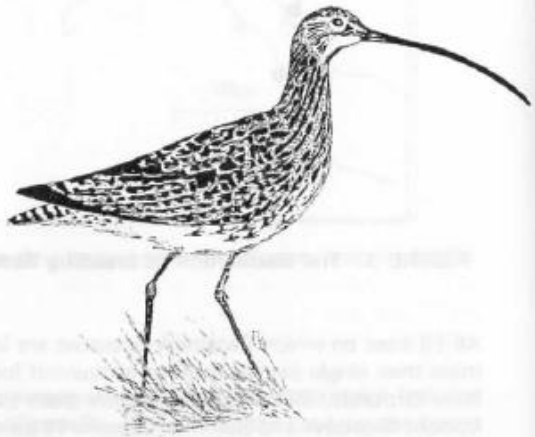
TABLE 3. Main sites for breeding Redshank in the Severn Vale, 1995
(Density refers to pairs km^{-2} on suitable habitats)

Site name	*Area*	*Pairs*	*Density*	*% Total*
New Grounds, Slimbridge	152.0	15	10.9	22.4
Upham Meadow & Summer Leasow	190.2	9	6.3	13.4
Bredon's Hardwicke (East)	150.0	7	6.0	10.5
Aylburton Warth	168.0	6	4.8	9.0
Saul Warth	101.3	5	7.9	7.5
Upton Ham	137.2	3	2.2	4.5
Severn Ham	123.0	3	2.4	4.5
Bow Farm	80.4	2	4.7	3.0
Chaceley Stock	201.5	2	1.1	3.0
Olgeham & Aysham	48.6	2	5.2	3.0
Bredon's Hardwicke (West)	69.1	2	5.7	3.0
Wibdon, Pillhouse Rocks	50.0	2	4.0	3.0

In addition, the following sites held single pairs: Northfield Meadows, Prior's Norton, Ridge Sand Marsh, Pennsylvania Fields, Powick Meadow, Uckinghall Meadows, Kempsey Lower Ham, Northwick.

CURLEW

Forty-two pairs of Curlews were recorded throughout the whole catchment (Figure 4). They were almost completely absent south of Gloucester and were found predominantly near Tewkesbury. Curlew were less concentrated than Redshank or Lapwing and the maximum number of pairs on any one site was three. Upham Meadow and Summer Leasow and Chaceley Meadows were the only sites to hold three pairs (Table 4) while Prior's Norton had the highest density (4.2 pairs km^{-2}).



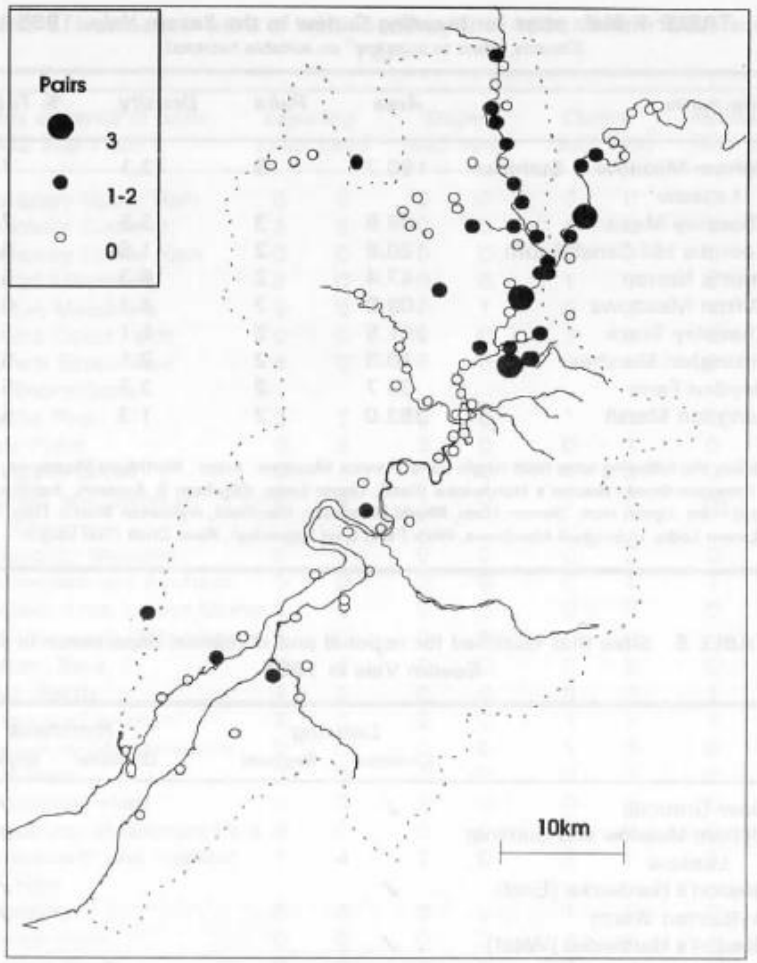


FIGURE 4. The distribution of breeding Curlews in the Severn Vale in 1995

THE MOST IMPORTANT SITES

No site was nationally important for any species using criteria described earlier. Only four sites were regionally important, all for Redshank and a further four sites were of divisional interest for either Redshank or Lapwing (Table 5). Together these eight sites accounted for 54% of all waders found. The remaining pairs were found on 38 other sites that qualified for local importance.

TABLE 4. Main sites for breeding Curlew in the Severn Vale, 1995
(Density refers to pairs km^{-2} on suitable habitats)

Site name	*Area*	*Pairs*	*Density*	*% Total*
Upham Meadow & Summer Leasow	190.2	3	2.1	7.1
Chaceley Meadows	84.8	3	3.5	7.1
Coombe Hill Canal South	120.9	2	1.8	5.3
Prior's Norton	47.4	2	6.3	5.3
Clifton Meadows	108.9	2	4.1	5.3
Chaceley Stock	201.5	2	1.1	5.3
Eckington Marshes	110.3	2	2.1	5.3
Hayden Farm	69.7	2	3.7	5.3
Longdon Marsh	353.0	2	1.3	5.3

In addition, the following sites held single pairs: Powick Meadow, Anon., Northfield Meadows, Mythe Pool, Longdon Brook, Bredon's Hardwicke (East), Upper Lode, Olgeham & Aysham, Ashleworth & Hasfield Ham, Upton Ham, Severn Ham, Rhydd Meadows, Hamfield, Aylburton Warth, Opp. Severn Ham/Lower Lode, Uckinghall Meadows, Wick Farm (Lwr Apperley), River Chelt (The Leigh).

TABLE 5. Sites that qualified for regional and divisional importance in the Severn Vale in 1995

	Lapwing		*Redshank*	
	Divisional	*Regional*	*Divisional*	*Regional*
New Grounds	✓			✓
Upham Meadow and Summer Leasow				✓
Bredon's Hardwicke (East)	✓			✓
Aylburton Warth				✓
Bredon's Hardwicke (West)	✓			
Saul Warth			✓	
Upton Ham			✓	
Severn Ham			✓	

THE 1982 AND 1995 SURVEYS COMPARED

Coverage in 1995 was far better than in the 1982 national survey (Smith 1983) and, thus, far more waders were counted - 227 pairs in 1995 compared to 125

TABLE 6. Numbers of pairs of waders surveyed in 1982 (Smith 1982) and in 1995

Sites covered in both 1982 and 1995	*Lapwing*		*Snipe*		*Curlew*		*Redshank*	
	1982	*1995*	*1982*	*1995*	*1982*	*1995*	*1982*	*1995*
Kempsey Upper Ham	0	0	0	0	0	0	0	0
Ashmoor Common	2	5	0	0	1	0	3	0
Kempsey Lower Ham	0	0	0	0	0	0	0	1
Rhydd Meadows	8	0	0	0	1	1	3	0
Clifton Meadows	8	0	0	1	9	2	7	0
Ryall's Court Farm	0	0	0	0	3	0	0	0
Severn Stoke Ham (Northfield)	4	0	0	0	0	1	0	1
Mythe Pool	3	2	0	0	1	1	1	0
Bow Farm	0	6	0	0	0	1	0	2
Longdon Brook	6	5	0	0	0	3	0	0
Upham and Summer Leasow	6	4	1	0	1	3	10	9
Eckington Marshes	0	3	0	0	0	2	0	0
Gooseham and Aysham	0	0	0	0	0	1	1	2
Falfield Area, Lower Stone	0	0	0	0	0	0	0	0
New Grounds, Slimbridge	4	23	0	0	0	0	1	15
Elmore Back	2	0	0	0	0	0	0	0
Saul Warth	4	5	0	0	0	0	3	5
Walmore Common	3	2	2	0	1	0	3	0
Corn Ham/Minsterworth	0	0	0	0	1	0	0	0
Port Ham	0	0	0	0	0	0	0	0
Maisemore Ham	0	0	0	0	0	0	0	0
Sandhurst-Maisemore Park	0	0	0	0	1	0	0	0
Ashleworth and Hasfield Ham	7	4	2	0	2	1	3	0
Chaceley	0	0	0	0	1	1	0	0
Severn Ham	0	0	0	0	1	1	1	3
Carrant Brook	0	0	0	0	0	0	0	0
Coombe Hill Canal	2	0	0	0	1	2	0	0
Canal at Parkend Bridge	1	0	0	0	0	0	0	0
Totals	60	59	5	1	24	20	36	38
Totals (excl. Slimbridge)	56	36	5	1	24	20	35	23

in 1982. This does not mean that waders have increased in abundance over the period. Comparing numbers of pairs counted on the 28 sites covered in both surveys suggests initially that there has not been a major change, 125 pairs in 1982 compared to 116 in 1995 (Table 6). Closer examination of the data reveals that the New Grounds, Slimbridge wader population increased greatly from only 5 pairs in 1982 to 38 pairs in 1995. This is a product of successful habitat management by WWT and does not reflect the trend at the majority of wet grassland sites in the Severn Vale.

Excluding Slimbridge from the analysis, the number of pairs counted on the remaining 27 sites was 120 in 1982 and 78 in 1995, a reduction of 35%. For each species, changes in total numbers on these 27 sites were as follows: Lapwing (-36%), Snipe (-80%: there were just five pairs in 1982), Curlew (-21%) and Redshank (-37%). This supports the widely held belief that breeding waders have continued to decline in the Severn Vale since the 1980s.

WADER HABITAT

The summed area of all fields on which waders were found amounted to only 14.8% of the total 7,014 hectares surveyed and varied from 0.1-7.2% between species (Table 7). This means that a very small proportion of, presumably once suitable, land in the flood plains of the Severn is being used by breeding waders and shows that the majority of low-lying habitat is no longer suitable for them. The following sections describe the nature of this habitat and offer an insight into why there are so few breeding waders in the Severn Vale.

Rough unimproved pasture accounted for 7% (507 ha) of the total area surveyed while semi-improved and improved accounted for 24% and 17% respectively (see first column, Table 8). There is likely to be a strong bias towards unimproved pasture since sites were often selected on the basis of this type of habitat.

TABLE 7. Field areas occupied by waders in the Severn Vale in 1995

Species	*Area occupied by waders (ha)*	*% Total area occupied*
Lapwing	421.9	6.0
Snipe	4.1	0.1
Curlew	504.1	7.2
Redshank	495.5	7.1
All species	1039.2	14.8

Grasslands were cut for silage twice as often as for hay. Tussocky grasslands were rare and just 3.5% of all grassland held any. More crops were sown in the autumn (16%) than in spring (13%). Most other land-use types were less important and widespread. Set-aside accounted for 3% of the area surveyed most of which was in the Severn Corridor. Saltmarsh accounted for just 2%.

Table 8 also summarises the percentage of nesting waders that occurred on each habitat type. Collectively, 57% of all waders nested on grassland while the rest were found on a variety of other farmland habitats. Semi-improved pasture held most (29%) because it was the most prevalent land-use type in the region. Unimproved grassland held 16% of all waders although it accounted for just 7% of the total area surveyed. Most of the remaining waders were on spring-sown cereals (13%), saltmarsh (9%) and improved pasture (7%).

Only 37% of Lapwing pairs nested on all grassland types collectively while over 75% of Redshank and Curlew nested on grassland. Lapwing also used a wider variety of habitats. Spring-sown crops (24%) and saltmarsh (13%) were the most important of these. The high proportion on saltmarsh is noticeable given that just 1.9% of the area surveyed fell into this category and was largely due to the WWT managed reserve at Slimbridge. Of wider relevance is the relative contribution of

TABLE 8. The percentage of breeding pairs found on each land-use type (in descending order of area) in the Severn Vale in 1995

The percentage (rounded to the nearest digit) of the total area surveyed under each land-use type is given in parentheses after each land-use name.

Habitat (% total area surveyed)	*Lapwing*	*Snipe*	*Curlew*	*Redshank*	*All Species*
Semi-improved pasture (24%)	13.0	100	40.0	49.2	29.0
Improved pasture (17%)	6.1	0	17.5	3.1	7.2
Autumn-sown crops (16%)	7.0	0	2.5	0	4.1
Spring-sown crops (13%)	24.4	0	0	0	12.7
Silage (11%)	0.9	0	7.5	3.1	2.7
Unimproved pasture (7%)	17.4	0	7.5	18.5	15.8
Hay (6%)	0	0	5.0	4.6	2.3
Set-aside (3%)	10.4	0	10.0	0	7.2
Saltmarsh (2%)	12.7	0	0	7.7	8.6
Other (2%)	8.8	0	10.0	13.8	10.4
Total grassland (65%)	37.4	100.0	77.5	78.5	57.0

spring (24%) and autumn-sown crops (7%); there is a clear preference for the former over the latter, as has been found nationally (Shrubb & Lack 1991). It is unlikely that any of the Lapwings seen on autumn sown crops bred successfully because it is not suitable habitat for rearing young.

Over 75% of Curlew and Redshank pairs were found on grasslands. Curlew were found mainly on semi-improved and improved pasture but surprisingly few were found on unimproved fields. This may have been because much unimproved pasture was too short for Curlews who like the long grass provided by silage and hay meadows. Set-aside (10%), hay meadows (5%) and silage (7.5%) were the remaining most important areas for Curlew. Redshank had generally similar preferences although fewer nested on improved pastures than Curlew.

WETNESS OF LAND

For most wader species, a high water table is important for successful feeding. On the first visit, ditch levels were recorded for fields covering 3,918 hectares. Of this area, 12% included fields with ditch levels ≤1/3 m below the field level, 13% had ditch levels between 1/3 m and 2/3 m and 75% with ditch levels >2/3 m. Thus, ditch water levels in most fields were very low. As the spring progressed into summer, water levels fell further. The area covered by fields with ditch levels ≤1/3 m fell from 125 hectares on the first visit in April to 38 hectares on the third in June (including only fields covered on all three visits).

Over all sites, fields with a total area of only 162 hectares (2.3% of the total area surveyed) were classified at any time as holding some standing water with a combined area of just 21 hectares. On sites visited three times, this once again fell from 9.4 hectares on the first visit in April to 3.7 hectares on the final visit in June. Finally, only 262 hectares (3.7%) of the total survey area was classified as having 'wet' as opposed to 'dry' soil in the spring and this fell from 142 hectares on the first visit to 101 on the final visit on sites surveyed three times.

Thus most land surveyed had a low water table in spring and this generally became lower as the season progressed.

DISCUSSION

The results suggested that Lapwing declined by 36% during 1982-95 in the Severn Vale. This is less than detected by O'Brien & Smith (1992) who showed that Lapwing fell by 49% in the Midlands and by 55% in south-west England and Wales. In 1995, no individual site qualified for national recognition although WWT's population of 23 pairs at Slimbridge came closest, 17 pairs short of the threshold. Just three sites qualified for divisional significance. Published density estimates from two other areas in England - 5.7 pairs km^{-2} in the Norfolk Broads (O'Brien & Buckingham 1989) and 4.9 pairs km^{-2} in the Arun Valley, West Sussex

(Pilcher 1991) - show that densities of Lapwing in the Severn Vale (1.6 pairs km^{-2}) are relatively low. Comparing densities is difficult since estimates are heavily dependent on the initial site-selection process and the total area surveyed. Nevertheless high densities found in places like the Norfolk Broads are probably indicative of densities formerly found in lowland grasslands in the Severn Vale.

The reason for the overall low population density in the area is likely to be related both to the overall pattern of land-use and water level management. Lapwings favour mixed, low intensity farmland (Galbraith 1988, Shrubb & Lack 1991) because the bare areas provided by spring cultivated land are good nesting areas while adjacent unimproved pasture is ideal for rearing young. The national trend in agriculture has been a switch to high intensity specialised farming and away from mixed farming. This is thought to be largely responsible for the substantial declines in Lapwing populations throughout Britain but especially in southern England (Shrubb & Lack 1991). Restoring Lapwing to former densities would require major changes in agricultural policy and not just changes in water management practices. Improving water management may benefit a few individual sites, especially those where Lapwings nest on grassland, but restoration of Lapwing densities to former levels and densities will only come about with major incentives and, or, changes in agricultural policy.

The results have shown that Snipe are now virtually absent as a breeding bird in the Severn Vale. Even in 1982, only 5 drumming Snipe were found on the 28 sites surveyed although most of the wet grassland had already disappeared by then. The most recent breeding atlas (Gibbons *et al.* 1993) has shown the decline of Snipe to be particularly serious over the last 20 years throughout much of lowland Britain. Snipe distribution is highly linked to that of marshy ground since they need soft substrates to allow them probe for sub-surface invertebrates (Green 1988). Robins (1987) suggested that the decline on the Somerset Levels was probably due to a falling water table because of land-drainage and a disappearance in tussocky grassland due to intensified grazing pressure. Wet and tussocky grassland is now very rare in the Lower Reaches of the Severn and this almost certainly explains the absence of Snipe. Restoration of Snipe to former areas will require both careful water level management in selected areas and control of grazing pressure on unimproved pasture.

No single site in the survey qualified for national, regional or divisional importance for Curlew. Densities were generally very low but were of similar magnitude to the Somerset Levels (Robins 1987) and the Upper Thames (Weaver 1994). Highest densities in Britain are in Orkney where up to 12 pairs km^{-2} can be found on moorland (Gibbons *et al.* 1993). Traditionally birds of moor and uplands, Curlews have expanded their range onto lowland grassland this century but the expansion slowed down in the 1950s and was then followed by local declines due, it is thought, to further changes in land-use and management (Sharrock 1976). The most recent atlas has shown local declines in several parts of southern Britain,

especially in the Midlands and in Devon. Conversations with local farmers in the Severn Vale support the view that Curlews used to be much more common in the area.

The density of Curlews, and their breeding success, has been shown to be directly related to the proportion of unimproved pasture on sites in northern England (Baines 1988) so the gradual increase in intensive grassland farming throughout Britain is likely to have had a deleterious effect. Traditionally a higher proportion of land was used for hay making but increasing dry and dairy stock farming has intensified pressure on grasslands. As well as increased grazing, the now widespread practice of cutting silage early in the season, rather than hay late, takes its toll on Curlew clutches and their unfledged young. This survey has shown that hay-making is no longer prominent in the Vale and has been taken over by silage. Again Curlew densities can be improved only with significant changes in agricultural practices. Of more immediate importance is to increase awareness amongst farmers of ways in which they can avoid killing young birds when cutting grass for silage or when rolling uneven ground in spring.

The average density for the area was 0.8 pairs km^{-2}, much lower than the best sites in England; for example, 10.6 pairs km^{-2} on the Ouse Washes, 5.3 pairs km^{-2} on the Nene Washes and 7.8 pairs km^{-2} on the North Kent Marshes (Smith 1983). At 0.3 pairs km^{-2}, the density on the Somerset Levels was even less than in the Severn Vale. WWT's reserve at New Grounds, Slimbridge had a comparably high density, 9.9 pairs km^{-2}, and several other sites had densities approaching 5.0 pairs km^{-2}. Despite these low densities, the Redshank was the only species for which any site in the study area was regionally important and is thus the species for which the Severn Vale was most important.

Redshank have the most restricted distribution of the four wader species nationally although, at 30,600-33,600 pairs, their national population is similar to Snipe. The extent of their national decline is also comparable to that of Snipe (Gibbons *et al.* 1993) and has been severest in inland southern England and in parts of Scotland. The comparison between the 1995 and 1982 data suggested a decline of 37% over this period in the Severn Vale, excluding New Grounds, Slimbridge from the analysis. This compares with an estimated decline of 55% from 1982 to 1989 in the Midlands which included most of the Severn Vale (O'Brien & Smith 1992) so perhaps the decline in the Severn has not been as severe as elsewhere in the Midlands.

The factors responsible for the decline of Redshank are similar to other species. Their habitat requirements are most similar to those of Snipe as they prefer tussocky grass subject to moderate grazing and of medium length. It is no coincidence that the highest density in the catchment was at Slimbridge where part of the WWT reserve is managed specifically for Redshank.

CONCLUSIONS

The Severn Vale held very low densities of Lapwing, Redshank, and Curlew in 1995. Snipe were virtually absent. This is similar to the pattern in much of southern England today, and is a result of a long-term decline in breeding waders, largely caused by changing agricultural practices and land drainage schemes. Information on land-use showed that unimproved pasture is scarce in the region, silage is cut in greater hectarage than hay, tussocky grassland is very rare and autumn-cultivated crops are now more important than spring crops. Each of these features is unfavourable to one or more nesting wader species. In addition, wet tussocky grassland was very rare, even in April, and this factor alone is likely to be responsible for the low densities of Snipe and Redshank. Because sites were not selected on a random basis, however, estimates of land-use are not applicable to the whole region. There was very likely to be a strong bias towards sites with unimproved wet and tussocky grassland so this habitat is even more scarce than the results suggest.

The maintenance of current numbers of breeding waders may be achieved by direct liaison with landowners. The RSPB have already passed the results from the 1995 season to the landowners and there is good reason to believe their response will be positive. While this approach should help to conserve current populations in the short-term, it may not be effective in the long-term, especially if the area acts primarily as a 'sink' rather than a 'source' habitat (Pulliam 1988). This means that the area might not contribute to maintaining its own population because of very low productivity resulting, in this case, from poor quality habitat. Instead, the maintenance of a population is heavily dependent on overflow from other areas with good quality habitats. Certainly restoration to a healthy self-sustaining population will require more drastic action on a national agricultural policy scale with backing and full cooperation from British government and EU bodies.

The success of any restoration plan will depend greatly on the goodwill of landowners and of the farming community particularly. There can be little doubt that this goodwill is there but due to the economic pressures which farmers face today, it is likely that success will only be achieved with realistic financial incentives and with cooperation from bodies associated with water level management.

ACKNOWLEDGMENTS: The survey was funded by the RSPB and the NRA. Special thanks to Ian Barber and Frank Lucas at RSPB, Central England Regional Office, for help with coordination and to Bob Bishop and Alan Churchwood at NRA, Tewkesbury. Thanks to the following people from local organisations for providing information and assistance: Charlotte Pagendam (English Nature), Andrew Jayne (Gloucestershire Bird Recorder), Peter Jones (RSPB Local Representative), Rob Macklin (Farming and Wildlife Advisory Group), Colin Studholme (Gloucestershire Trust for Nature Conservation), Chris Wells and Dave Paynter (WWT). A special

thanks to the volunteer fieldworkers for their considerable commitment in getting to grips with a difficult survey methodology. These were Mike Sheridan, Jane Kelsall, Damian Offer, Peter Whittaker, Mike Stephens, Roy Hunter, Peter Beveridge, Keith Garner, Lynne Garner, John Sanders, Mike Freeman, David Bullock, Mick Woodward, Margaret Woodward, Barry Tuck, Malcolm Clarke, John Icke, and Bob Bishop. Thanks also to my colleagues at Slimbridge who also helped with the fieldwork and in other ways: Jude Smith, Carolyn Billingsley, Simon Pickering, Bill Haines, Jeff Kirby, Mark Pollitt, Paul Rose, Marcus Rowcliffe, Dave Paynter, Phil Shepherd, Colin Menendez, Richard Pettifor and David Price. Finally, a special thanks to the many farmers and landowners who granted permission for access to their property, and to those who shared their knowledge of, and enthusiasm for, the wildlife on their land.

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THE WOODLARK - A SPECIES SPANNING CHANGE

John Christian

HISTORICAL STATUS

The Woodlark *Lullula arborea*, a resident species in Britain, is now chiefly confined to the south and south-east (Sitters 1993). It became absent from Gloucestershire circa 1968 (Sharrock 1976, Swaine 1982). Until its exodus, it was found in the Forest of Dean, in the Cotswolds upon the escarpment and less frequently on the dipslope, and in a small population in the vicinity of Redmarley (Swaine 1982). It is mentioned in early wildlife surveys of Gloucestershire but with some confusion and uncertainty (Witchell & Strugnell 1892, Mellersh 1902).

Nationally, it once extended westward into the Welsh uplands. In 1953 I heard Woodlarks singing on moorland at 700 feet above sea level in the western Plynlimon foothills. In the east the species extended north to Northumbria (Sharrock 1976). Immediately north of Gloucestershire it was found in typical habitat on the Malvern Hills and it may have been the populations of Dean and the Malverns that the Redmarley incidence linked.

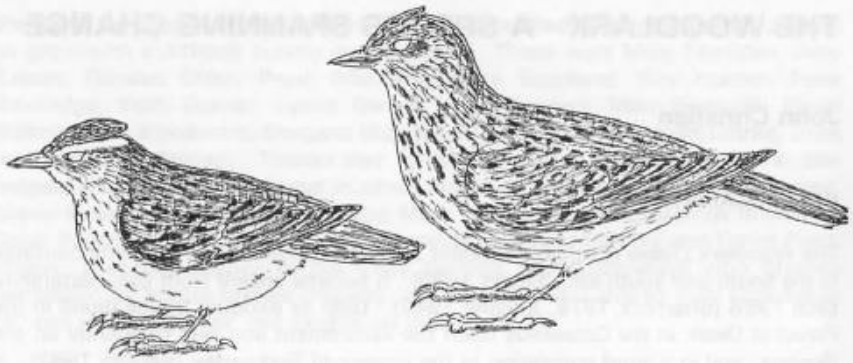
DETERMINANT HABITAT

Typical Woodlark habitat might be summed up as well-drained portions of grass or heather heathland, with or without bushy scrub and only distant woods or scattered spinneys of trees. An essential characteristic of the habitat is the incorporation of areas where undergrowth is reduced to a low field-layer. Patches of bare soil, where the birds can feed in contact with the soil with ease, might be essential. Such collective conditions are found in warrens, on mining spoil, on upland, and, artificially, on golf-courses. At most the species might be described as a woodland-edge species, never a woodland species as suggested by its name and the case of Dean, by its association with forest areas.

In the withdrawal of the species eastward, upland regions seem to have been vacated in favour of comparatively lower, more temperate areas but the matter of altitude may not be the simple or only answer to this manifestation.

OUTSTANDING PHYSICAL CHARACTERISTICS

In comparison with the better known Skylark *Alauda arvensis*, the Woodlark is not only smaller but noticeably dumpier with a shorter tail and a less upright stance. The following sketches compare the two, at the same time illustrating the lower



Woodlark **Skylark**

carriage of the Woodlark.

The Woodlark is less frenetic in its movements than the Skylark, tending, when not under stress, to assume a leisurely and hen-like carriage. It has bronze-like - almost orange - hues about its plumage. There are pronounced light eye-stripes which meet conspicuously behind the head at the nape, delineating a cap of dense, darker markings.

The Woodlark's song may be protracted to half an hour. It is a continuous flow of liquid and flute-like notes in series of falling cadences. In songflight the bird spirals upward and, having reached a satisfactory height, may circle in a leisurely fashion. The Skylark on the other hand, faces into the breeze, or in one direction even when there is no breeze, rising like a yo-yo and has less duration. The two species may have adjoining territories but do not normally share.

STATUS IN DEAN PRIOR TO EXODUS

The status of the Woodlark in the Forest of Dean prior to its exodus has been understated. Swaine (1982) says for instance, "In former years these huge mounds [of mining spoil] provided breeding sites for a few pairs of . . . Woodlark". This observation seems to restrict the scope of the bird to "huge" mounds and to limit its numbers to "a few". In practice however, wherever the detritus of mining and its associated industry lay, in the sheep-grazed spaces between Forest homesteads and along the railways and tramways, Woodlarks were to be found, often in continuity. There were for example, in 1950, within a square of terrain totalling 3¼ square miles, north of Cinderford, not less than 28 breeding pairs. Beyond and around this square there were additional pairs. Having deducted all atypical habitat - that for instance comprised of forest enclosure, township and

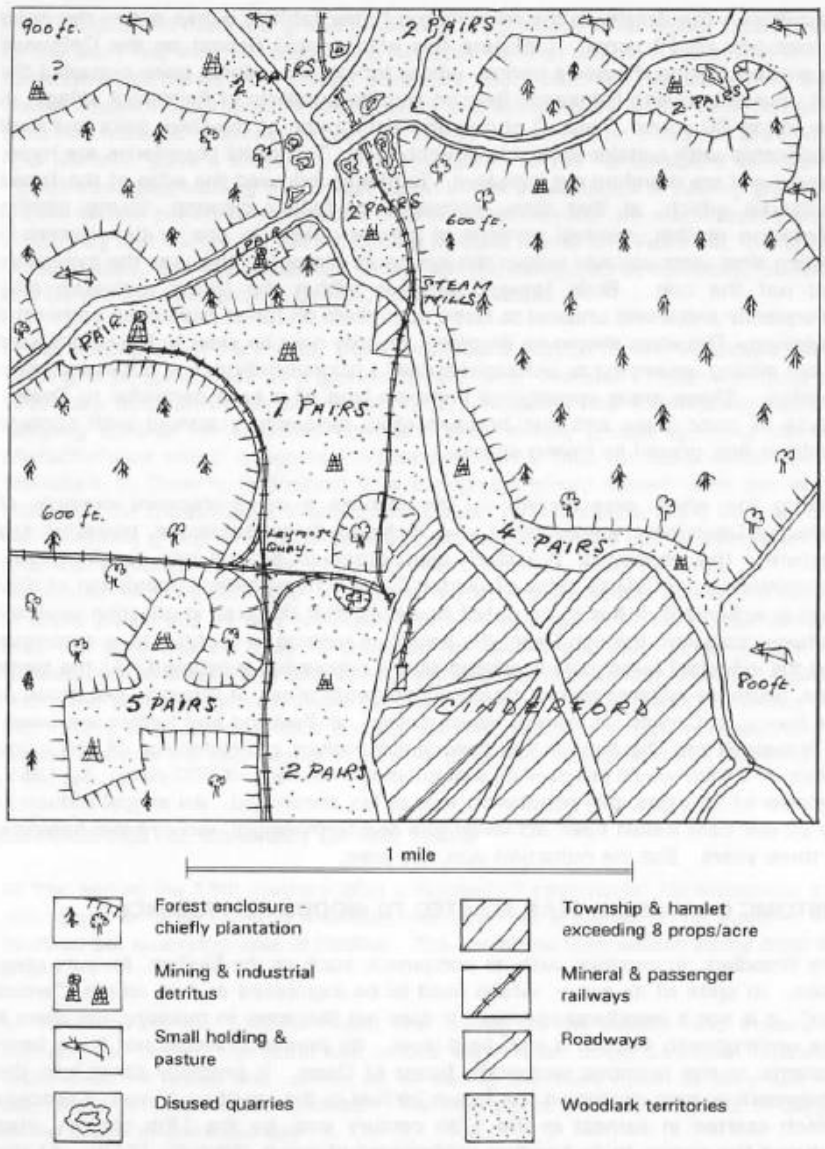


FIGURE 1. Distribution of Woodlark territories in an area of 3¼ sq. miles - north of Cinderford in 1950

agriculture - the density in the remaining suitable habitat, works out to the order of one pair to 10 acres. Compare this with typical habitat on the Cotswold escarpment during the same period, where for instance, three pairs occupied the golf course between Painswick Beacon and the outskirts of Painswick village, at one pair to 30 acres. Figure 1 shows the distribution of the Dean pairs and their relationship with suitable available environment. Territorial boundaries are hypothetical and are therefore not indicated. Territories followed the edge of the forest enclosure which, at that time, consisted of fallow clearing, young conifer plantation or thin, residual screens of mature oaks. In one or two instances nesting sites were actually within the enclosure fence but this was the exception and not the rule. Birds foraged or sang within the forest enclosure only infrequently and it was unusual to come upon them on forest rides deep within the enclosure. The areas shown as Woodlark territory may be seen to have consisted of old mining, quarrying or industrial sprawl - occasionally in use but in the main derelict. These areas constituted common land of a type particular to Dean - tracts of poor grass and thin bracken often randomly scattered with cottage holdings and grazed by roving sheep.

Taking the whole area shown on the map as a comprehensive example of collective Dean forest environment - *i.e.* including forest enclosure, township and pasture - the density of Woodlark pairs drops to around one per 57 acres. Compounded over 50 sq.miles of central Dean, a hypothetical population of 450 pairs is achieved! It has to be noted however, that the area in question was not perhaps consistent through Dean, the enclosure tending to become more extensive and the industrial areas more scattered as one proceeded westward. At the same time, relatively isolated mining tracts within larger areas of forestry, like those at the Fancy, at Cannop, at Speech House Colliery, at Parkend and further westward at Broadwell and Mile End, all had their concentrations of Woodlarks. A reduction factor of a third would still provide a population in excess of 300 pairs. By 1965, a matter of 15 years, this population was all but eliminated. An annual reduction by 20 per cent would have achieved this and furthermore, would have halved it in three years. But the reduction was not even.

HISTORIC CHANGES IN DEAN RELATED TO WOODLARK PRESENCE

The Woodlark, in common with its congeners, such as the Skylark, favours clear skies. In spite of its name, which used to be expressed as two words, "wood lark", it is not a woodland species. It does not like trees in quantity; nor does it like undergrowth beyond a thin field-layer. Its presence would not have been endemic in the primitive temperate forest of Dean. It probably came into the ecosystem as man consumed the forest for fuel in the smelting of iron, a process which started in earnest in the 12th century and, by the 18th century, had reduced the region to "a howling wilderness" of scrub (Nicholls 1866). At the beginning of the 19th century after some considerable interaction between the interest of iron smelting and timber conservation, George III's Dean Forest (Timber)

Act, 1808, set in motion a grand replanting programme. The timber lobby, aided by the Navy had won. The opposing interests were at peace. Timber and mining coexisted side-by-side for almost a century and a half. At the same time there was a modern resurgence in iron mining and smelting by which time however, coke had replaced charcoal as fuel. In 1858, the social and industrial chronicler, H.G.Nicholls, gave a singularly lucid description of the Forest scene as follows: "Most strangers visiting the Forest do so in the expectation of seeing groves of stately timber covering the ground in every direction and are much disappointed when they find the greater part to consist of Oaks barely fifty years old, comprised in enclosures, and the remainder of the surface disfigured by furnaces, collieries and by groups of inferior buildings." (Nicholls 1858).

In this description of the Forest, there was clearly habitat for the Woodlark, albeit tending to be surrounded by a growing timberland. Mellersh (1902) mentions the Woodlark in Dean in his survey of 1902. Mellersh had an irritating habit of lumping species for standard comment into unlikely groups ignoring obverse characteristics which otherwise separated them. Thus his observation on the Woodlark in Dean is expressed in a paragraph jointly shared with the Wood Warbler , the Grasshopper Warbler, the Lesser Whitethroat and the Wryneck! A more unlikely group of bedmates one could hardly conjure up! Notwithstanding this, he achieves a degree of hit-and-miss truth in what he says: ". . . the distribution of these [species] . . . is localised by the denseness of the oak woods in some parts, and by lack of undergrowth in other parts." No matter perhaps that the presence of trees is essential for Wood Warblers, undergrowth for Grasshopper Warblers and lack of undergrowth for Woodlarks! The parts where both trees and undergrowth were restricted were the sheep-grazed commons and old mining sites. Here within it, was the antithesis to a forest ecosystem, a paradox within the boundaries of an area otherwise recognised and identified as a forest.

ENVIRONMENTAL CHANGES OF THE 1940s

At the end of the 19th century after a number of spectacular bankruptcies, iron mining and smelting came to a sudden end; coal mining carried on for another fifty years or so; quarrying was in decline. The bereft owners walked away from the litter.

In 1940 during the Second World War owing to the sudden and imperative demand for timber, the great oak woods were felled using Canadian timbering techniques for speed and, above all, rendering the skies open, as they had not been since "the howling wilderness". The Woodlarks took off in spirals of delight in the space of the clear air!

I suspect that by 1944 when I first discovered Woodlarks nesting in the Forest, they were undergoing a spate of increase which, sadly preceded their ultimate

demise. Dr Bruce Campbell and his local colleague Mr Henry Hook of Parkend were also observing the bird over in the West Dean district. In 1970 when, in the company of Bruce Campbell and Stephen Cooper, I carried out a tour of the old territories, we neither saw nor heard a bird and concluded they were all gone.

DISTURBANCE FACTOR ON WOODLARK HABITAT IN DEAN

Woodlarks in their heyday were never hampered by disturbance. Their success was partly due to their ability to settle into fairly well used areas - little bits of sheep-grazed common between Forest cottages, derelict ground around working quarries, upon railway tracks - a much favoured nesting ground. One pair nested a few yards from the busy weighbridge of a quarry, another in scraps of cover alongside a children's recreation ground next to the swings and roundabouts and many alongside the metals of the railtracks. The sketches shown in Figure 2, based on photographs taken in 1949 at Laymore Quay - so-named because it was the depot where mineral coal and iron was loaded upon the national railway system (sometimes erroneously called Laymore Quag) - show a nest and its position below the signal operating wire of the Bullo to Northern United Colliery railtrack, only feet from the wheels of the steam loco which travelled the track several times daily.

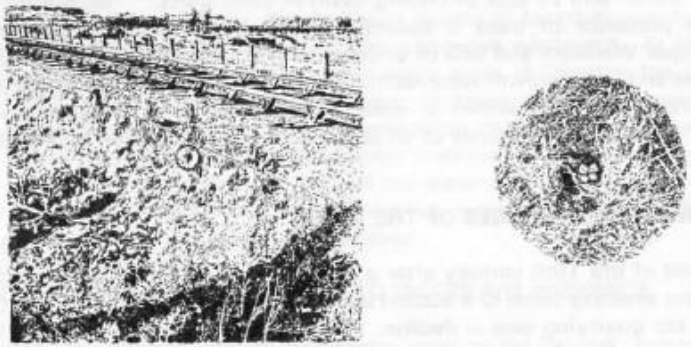


FIGURE 2. Nest of Woodlark

RELATIONSHIP OF WOODLARKS WITH SHEEP

It was the presence of sheep however which aided the success of the Dean's high population of Woodlarks. The allegiance between the two was critical. Wherever Forest sheep roamed over the sparse grass of the old mine tips, littering the

ground with their faeces, clipping the already struggling *Nardus* grass to a patchy, threadbare cover and little patches of bitten-off rushes lay side by side with scraps of dead bracken, with perhaps a thistle or two, there would be Woodlarks.

On this soured ground, still showing the unyielding blueness of the shales and clay brought up from the bowels of the earth, the best that emerged from the mixture of earth and sheep-dung were myriads of flies and midges when the temperature rose. Along the barren ridges of the sheep paths the Woodlarks picked a living from this insect-life and its larvae.

CONSIDERATIONS OF TOXIC CHEMICALS IN SHEEPDIP

The exodus of the Woodlark from the west has been wholesale. Climatic changes are suggested as the cause. The sudden crash in the 1960s however, suggests something more positive and immediate. Professional research has already shown that the introduction of complex toxic chemicals by agriculture into the environment, dealt a blow to many species. Even as late as 1969 the Forestry Commission, now so conservation-minded, was using defoliants to reduce weeds.

But it was in the association of Woodlarks with sheep that I suggest damaged the bird most. Before the war, sheep dips were relatively non-toxic. They contained tar oils and soaps to control scab and maggots. At worst, arsenious compounds were used to a limited degree. Modern dips, introduced in the 1960s are classified as OPs and Non-OPs. The former contain organophosphorus compounds. Most OPs are so toxic to humans that they now require an operating licence and stringent operating control in their usage. Largely ignored at first, the mounting evidence of toxic reaction in handlers has prompted the DoE, through the Health and Safety Executive, to issue detailed instructions on use, disposal of surplus dip and health monitoring (HSE 1994).

A personal communication from the Veterinary Medicines Department indicates that dipping is mostly carried out from May to July. Moreover, in the 1960s compulsory dipping was reintroduced after a short pause.

The extreme toxicity of OPs, as described in the HSE leaflet, makes alarming reading. Handlers, for instance, are advised to use safety clothing of very high quality; shearing after the use of OP dipping is not recommended for three months.

The residues of organophosphorus compounds were certain to have affected the health of Woodlarks. It is apparent that the demise of the Woodlark and the history of sheep husbandry show a marked convergence; likewise the Wheatear, though this is another story.

It is perhaps significant, that the Woodlark disappeared from the Welsh uplands during the 1960s where sheep also formed part of its environment.

CURRENT SCOPE FOR WOODLARKS IN DEAN

There still exists in the Forest as well as on the Cotswold ridge, ground eminently suitable for Woodlarks. The picnic sites and the Dean Leisure Park at Cinderford running the length of the erstwhile Woodlark territories, still presents some of the features the bird likes. The presence of people is not a problem. The Woodlark is not, however, a species that one might artificially reintroduce. Recolonisation from the south and east is the only way. Yet there is some hope. It is said that if the traffic noise on the M25 were muted one would hear the sound of Woodlarks singing above the Surrey golf-courses. In the East Anglian forests, made on the sandy soils of the coastal heaths and breckland, modern management techniques like stripping the ground of felled plantations using scraping machinery to render fallow strips of sparsely covered ground, has encouraged Woodlarks. Here sheep are excluded but the bare, hot soil is full of larval fly-life.

It is not impossible, provided that the manufacturers of agricultural chemicals are responsibly controlled, that the flute-like song might again one day cascade down in fragments of pure delight like manna to starving ornithologists.

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BEWICK'S SWANS IN GLOUCESTERSHIRE

Jonathan M. Bowler and Eileen C. Rees

Bewick's Swans *Cygnus columbianus* are the smallest and rarest of the three swan species that occur in the British Isles. They breed only in the far north of Arctic Russia and fly south to spend the winter in warmer countries. Some 25,000 - 30,000 birds from the eastern part of the breeding range winter in Japan, China and Korea (Mineyev 1991, Rose & Scott 1994). Those from the western part of the range number around 16,000 - 17,000 and spend the winter at various sites in northwest Europe, particularly in England, Ireland and The Netherlands, with smaller numbers in Scotland, Denmark and Germany (Ogilvie 1972, Dirksen & Beekman 1991, Rose & Scott 1994). The single most important midwinter site for the species in northwest Europe is the Ouse Washes at Welney on the Norfolk/ Cambridgeshire border, where up to 6,000 individuals may occur. Other important sites for the species in Britain are the Nene Washes in Cambridgeshire, Martin Mere in Lancashire, Breydon Water in Norfolk and the Severn Estuary in Gloucestershire. Smaller numbers occur at other sites such as Walland Marsh in Kent, the Avon valley in Hampshire and the Somerset Levels, particularly during periods of extensive winter flooding.

This paper reviews the history of Bewick's Swans in Gloucestershire. It describes the development of the wintering flock on the Severn Estuary based at The Wildfowl & Wetlands Trust's Slimbridge reserve, together with aspects of the research carried out on the swans by WWT. The use made of sites in Gloucestershire by the birds is reviewed in relation to habitat use and changes in the winter distribution of Bewick's Swans throughout northwest Europe.

THE SLIMBRIDGE HERD

The Severn Estuary flock is based at the New Grounds, Slimbridge, where a regular herd of 250 to 350 swans now spend the winter. Slimbridge is the fifth most important wintering site for Bewick's Swans in the United Kingdom (Cranswick *et al.* 1995) and, since it receives more than 1% of the western European wintering population each winter, it is recognised as an internationally important site for the species, being designated both as a Ramsar site and as a Specially Protected Area (SPA). The first Bewick's Swans generally return to Slimbridge in the third week of October with numbers building up into the New Year. Birds begin to leave the site at the start of their spring migration during the latter part of February, although they may remain in good numbers for the first two weeks of March, with the last stragglers typically leaving at the very end of the

month.

Although Slimbridge is now an established wintering site for Bewick's Swans, this was not always the case. When The Wildfowl & Wetlands Trust (then the Severn Wildfowl Trust) was founded at the New Grounds, in 1946, only small numbers of Bewick's Swans visited Gloucestershire. Bewick's Swans were first recorded at Slimbridge in 1948 but they did not winter regularly at the site until the 1963-64 winter. During the 1950s counts of up to 30 individuals were made on the accreting area of raised salt-marsh between the sea wall and the Severn estuary, known as the "Dumbles", which floods on occasion during high spring tides (Ogilvie 1969). In February 1964, 24 wild Bewick's Swans wintering on the salt-marsh were attracted to a pen within the WWT's enclosures known as the "Rushy Pen", by the presence of seven captive individuals. The swans' use of the Rushy Pen was reinforced by the regular provision of grain and protection from disturbance, and the birds continued to visit the pen for several weeks and returned the following winter (Scott 1966). The Rushy Pen and its pool system lie directly in front of the house formerly occupied by Sir Peter Scott. By painting the black and yellow bill patterns of individual swans, Sir Peter and his family realised that they could identify all the birds as they returned to the lake each day for food. The swans were each given a name and this proved to be the start of a unique long-term study (see below).

The number of swans at the New Grounds rose each year thereafter until the 1970-71 winter, when 411 were present on one day and 627 individuals were recorded during the winter (Evans 1979, Figure 1). The period of recruitment to the Slimbridge flock appeared to reach a plateau in 1969-70, since the proportion of "experienced" swans (*i.e.* where the individual, or at least one member of a pair or family, had been recorded at Slimbridge in a previous winter) exceeded the proportion of new swans from the 1969-70 season onwards (Evans 1979, Rees 1988, Bowler 1996). Subsequent numbers at the site have fluctuated considerably (see Figure 1), with more birds being recorded during colder winters when prolonged periods of freezing conditions and snow cover on the continent may force wintering birds westwards into Britain. Peak numbers occurred on 14 January 1979 when 610 swans were counted in the Rushy Pen during a prolonged spell of freezing weather. During the generally mild winters of the late 1980s and early 1990s, numbers have been more constant (Figure 1), with maximum daily counts generally between 250 and 350 birds.

THE SLIMBRIDGE STUDY

The bill patterns of adult birds at Slimbridge were found to change very little over time, and since many individuals proved to be very faithful to the site, the whereabouts and activities of individual birds could be followed not only day by day but also from year to year. To date, over 8,000 different individual birds have been

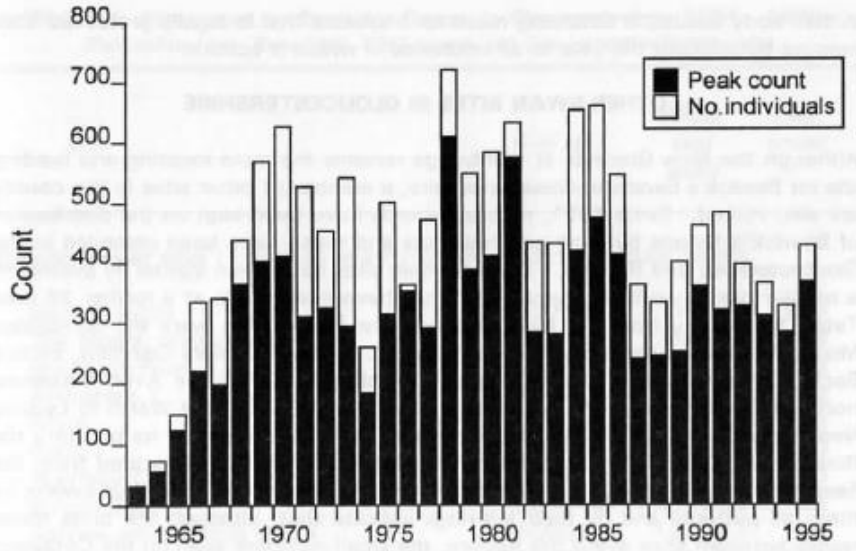

Figure 1. The maximum count of Bewick's Swans and the number of individual swans identified at Slimbridge for each winter between 1963-64 and 1995-96

identified at Slimbridge, and a broad picture of their life histories has emerged. The swans may live for up to 26 years and since the cygnets (up to five in a brood) normally remain with their parents during their first winter, it was possible to gather information on the swans' life-time pairing and breeding success without relying on artificial markings. The main aim of the Bewick's Swan research programme at Slimbridge is to monitor the life-histories of individual birds, and thus to determine the factors affecting their survival and life-time reproductive success. This may be used to explain changes in population size and distribution, and to identify their ecological requirements, which in turn may be used to improve the conservation status of the species.

The swans are now accustomed to being fed with grain in the Rushy Pen and twice a year some are caught in the specially designed 'swan-pipe' for ringing and to permit a closer look at individual birds. Each bird is fitted with a large uniquely-engraved plastic leg ring, together with a standard British Trust for Ornithology metal ring. Resightings of these birds have shed light on the swans' *ca.*4,000 km migration to and from the Russian Arctic (see Evans 1982, Rees 1991, Rees & Bacon in press) and have helped to promote the conservation of internationally important wetlands used throughout the migratory range. In some years the birds are also X-rayed and this has revealed that 30-40% of adult birds carry gun-shot

in their body tissues, a disturbing result for a species that is legally protected from hunting throughout the year in all countries in which it occurs.

OTHER SWAN SITES IN GLOUCESTERSHIRE

Although the New Grounds at Slimbridge remains the main roosting and feeding site for Bewick's Swans in Gloucestershire, a number of other sites in the county are also visited. Since 1951, regular records have been kept on the distribution of Bewick's Swans by local ornithologists and these have been compiled in the Gloucestershire Bird Reports. Thirteen main sites have been visited by swans on a regular basis, whilst incidental sightings have been made at a further 28 (see Table 1). Away from the New Grounds, the major sites were the Slimbridge Moors, Frampton Gravel Pits, Awre, Arlingham, Rodley, Walmore Common, Elmore Back, Ashleworth and Hasfield Hams, Coombe Hill Canal, the Avon Meadows north of Tewkesbury, the Cotswold Water Park and Aylburton Warth to Lydney New Grounds. All are closely associated with the River Severn, or its tributary the River Avon, except for the Cotswold Water Park which is separated from the Severn estuary by the Cotswold escarpment. Resightings of individual swans by their bill patterns and by their leg-rings indicate that, although the birds move readily between sites along the Severn, the small numbers seen on the Cotswold Water Park seem to form a separate flock (Rees 1988, 1990).

Away from the New Grounds, Walmore Common has been the second most important site for the swans in Gloucestershire since the early 1970s, and the high numbers recorded there resulted in its designation by the British Government as a site of international importance for the species under the Ramsar Convention in 1991 (it is also an SPA). Walmore Common, Rodley and the Coombe Hill canal meadows, are all low-lying areas of improved pasture, surrounded by higher ground, which flood during periods of heavy rainfall. Normally the water basins drain through a system of ditches into the River Severn but if the river is high, the water is unable to escape and flooding may persist for several weeks, at which time the swans congregate on the fields. The Slimbridge Moors is a similar area of wet meadows, dependent upon gravity drainage through the ditches. Ashleworth and Hasfield Hams lie adjacent to the Severn and are subject to flooding when the river is in full spate; the meadows along the River Avon north of Tewkesbury and into Worcestershire are similarly vulnerable to flooding. Ashleworth Ham was purchased by the Gloucestershire Wildlife Trust in 1968, since when it has been managed as a nature reserve, and the deliberate retention of water by closing the sluices in winter has resulted in Bewick's Swans using it as an alternative roost site, with high numbers feeding on adjacent pasture in some winters.

A comparison of the maximum swan counts obtained at the New Grounds each winter with the population trend indices for Gloucestershire (which control for

TABLE 1. Sites used by Bewick's Swans in Gloucestershire 1951 - 1996
(Data collated from Rees 1988, WWT records and Gloucestershire Bird Reports)

Site	*Grid ref.*	*Winter first used*	*Max. count*
Regularly used sites (* drained and no longer used on a regular basis).			
New Grounds	SO7204	1948-49	610
The Moors, Slimbridge	SO7203	1966-67	409
Frampton Pools	SO7507	1954-55	35
Arlingham *	SO7011	1983-84	200
Awre	SO7108	1979-80	216
Rodley	SO7412	1977-78	120
Walmore Common	SO7415	1963-64	380
Elmore Back *	SO7716	1954-55	28
Ashleworth/Hasfield Hams	SO8326	1962-63	150
Coombe Hill Canal	SO8727	1954-55	260
Avon Meadows north of Tewkesbury	SO9035	1962-63	262
Aylburton Warth - Lydney New Grounds	SO0062	1979-80	30
Cotswold Water Park West	SU09	1955-56	36
Occasional sites (swans seen in flight only are excluded).			
Beachley Point	ST5490	1988-89	5
Tidenham, Chepstow	ST5695	1972-73	3
Noxon Pond, Forest of Dean	SO5806	1962-73	5
Oldbury-on-Severn	ST6092	1973-74	2
Shepperdine, R. Severn	ST6195	1973-74	3
Berkeley floods	ST6898	1984-85	20
Berkeley shore, R. Severn	SO6600	1983-84	14
Frampton marshes	SO7405	1987-88	65
Whitminster, Stroudwater Canal	SO7608	1980-81	8
Saul, Gloucester-Sharpness Canal	SO7509	1961-62	15
Westbury-on-Severn	SO7113	1988-89	21
Longney	SO7512	1979-80	11
Minsterworth Ham	SO7916	1977-78	82
Sudmeadow, Gloucester	SO8218	1960-61	14
Maisemore/Over, R. Severn, Gloucester	SO8120	1955-56	9
Witcombe Reservoir, Gloucester	SO9010	1989-90	1

TABLE 1. Cont.

Site	*Grid ref.*	*Winter first used*	*max. count*
***Occasional sites** cont.*			
Wainlodes Hill	SO8526	1971-72	78
Tirley floods, Tewkesbury	SO8428	1984-85	78
Chaceley, R. Severn	SO8630	1983-84	17
Severn Ham & Lower Lode, Tewkesbury	SO8832	1983-84	29
Cowfield Farm, Tewkesbury	SO9134	1988-89	26
Ashchurch, Tewkesbury	SO9232	1985-86	10
Puckrup and the Mythe, Tewkesbury	SO8735	1981-82	30
Twyning Great Hay Meadow	SO9137	1990-91	42
Dowdeswell Reservoir, Cheltenham	SO9919	1983-84	4
Winchcombe, Sudeley Castle Lake	SP0327	1981-82	2
Bourton-on-the-Water Gravel Pits	SP10/20	1982-83	10
Little Barrington, R. Windrush	SP2012	1981-82	9

changes in the number of sites surveyed from year to year, as described by Owen *et al.* 1986) showed that the increase in numbers at the New Grounds was positively correlated with the numbers recorded throughout the county (Rees 1988). It seems, therefore, that the developments of the Slimbridge-wintering flock resulted in more swans using other sites in the surrounding area, rather than acting as a 'honey-pot' drawing birds away from nearby sites. Moreover, movements of ringed individuals indicate that some swans move out of Gloucestershire during the winter, and follow the River Wye upstream to use a range of flood-plain sites in Herefordshire and Powys.

Originally it was assumed that the build-up in the number of Bewick's Swans wintering in Gloucestershire was due to the conditions created by WWT at Slimbridge, with birds being encouraged to return to the area by the regular provision of grain in the Pens and protection from disturbance on the refuge. Birds familiar with Slimbridge would bring their new mates and offspring to the site in subsequent years, whilst naive birds (perhaps on their way west to sites in Ireland) might be tempted to join the large numbers already present. These factors are likely to have reinforced the New Grounds as a regular wintering site for the birds, but in addition, there has been a substantial increase in the number of Bewick's

Swans wintering throughout northwest Europe since the 1960s. Some 6-7,000 swans were recorded in the early 1970s (Atkinson-Willes 1976), 12,000 by the late 1970s (Scott 1980) and 16,500 during the winter of 1983-84 (Beekman *et al.* 1985), although numbers have subsequently stabilised with some 16-17,000 counted in the late 1980s (Dirksen & Beekman 1991; Rose & Scott 1994). There may also have been a movement of birds from The Netherlands to Britain during the 1960s and 1970s due to the decline in submerged aquatic vegetation in the IJsselmeer, which was an important food supply for the birds during the 1950s (Poorter 1991). The swans increasingly made use of grass leys and semi-natural grassland after 1968, and subsequently have also used cereals and root crops. During monthly surveys conducted in Britain and Ireland during the 1990-91 winter, the majority of Bewick's Swans (60.1%) were recorded feeding on arable land (Rees *et al.* in press).

Within Gloucestershire, the swans still frequent most of the sites used in the early years, although their use of sites in many cases reflects the extent of flooding in a given winter. Recent research at Slimbridge has shown that swans prefer to graze on extensively flooded fields, although selection for swards with a high protein content was also important (Bowler 1996). The use of sites distant from Slimbridge may rely on the presence of deep water nearby for safe roosting, since daily flights to and from the roost sites at Slimbridge would be energetically expensive. Drainage of the formerly important shooting marshes at Elmore in the 1960s has reduced their attractiveness to all waterfowl, whilst drainage associated with agricultural changes at Arlingham has similarly resulted in a reduction in the use of the site by swans. Although rather traditional in their choice of feeding sites, the swans can be quick to respond to changes in flooding and food supply. In the 1995-96 winter for example, large numbers were attracted to a flooded potato field at Minsterworth Ham, an area that had not previously been used by the swans.

At the New Grounds, the swans still spend some time feeding on the "Dumbles" salt-marsh, particularly when flooded, but now feed mainly on improved pasture or on the remnants of fodder beet crops in fields behind the sea-wall. Aylburton Warth provides the only other section of raised salt-marsh in the area, and small numbers of swans still visit this site on occasion together with the reclaimed Lydney New Grounds beyond. In recent years it has been noted that the swans make increasing use of the River Severn itself towards the end of the winter. Groups of swans fly out to pools off the New Grounds at low tide, where they appear to feed on invertebrates (no vegetation is present), the two most abundant being an amphipod (*Corophium*) and a polychaete worm (*Nereis* sp.) (Bowler 1996). Bewick's Swans have not previously been reported feeding on invertebrates during the winter, although this behaviour has been noted on the breeding grounds in Russia (*e.g.* Kondratiev 1991). Use of protein-rich invertebrate foods may be important at certain stages of the annual cycle, for

example immediately prior to departure on the return migration to Russia.

CONCLUSIONS

Gloucestershire is now firmly established as a wintering area for Bewick's Swans with some 250 - 350 birds regularly occurring in the county. Two sites: the Slimbridge New Grounds and Walmore Common, are currently recognised as being of international importance for the species; both are designated as Ramsar sites and Special Protection Areas, and annually support more than one percent of the northwest European wintering population. Swans based at the New Grounds make use of other sites in the county, particularly along the valleys of the Rivers Severn and Avon when floodwaters are present. Continued observation and recording of changes in the distribution of Bewick's Swans in the county is imperative so that both new and traditional feeding sites may be identified, and to ensure that these sites continue to receive management that is sensitive to the needs of the swans.

If any reader makes an observation of a colour-ringed Bewick's (particularly away from Slimbridge New Grounds) please send the details to: John Bowler, Research Dept., WWT, Slimbridge, Glos. GL2 7BT. Resightings of individually-marked birds are invaluable to our long-term studies, and all observers will be sent full life history details of the individuals that they observe.

ACKNOWLEDGEMENTS: Since the Bewick's Swan research programme began at Slimbridge in 1964 the following people have been involved in the individual recognition of swans by their bill patterns: Peter Scott, Philippa Scott, Dafila Scott, Pat Pollard, Maya Scull, Tom Pitcairn, Mary Evans, and Sue Carman. We are extremely grateful to the many people who report their sightings of Bewick's Swans in Gloucestershire, including ringed birds, upon which the study depends. Carl Mitchell kindly produced Figure 1.

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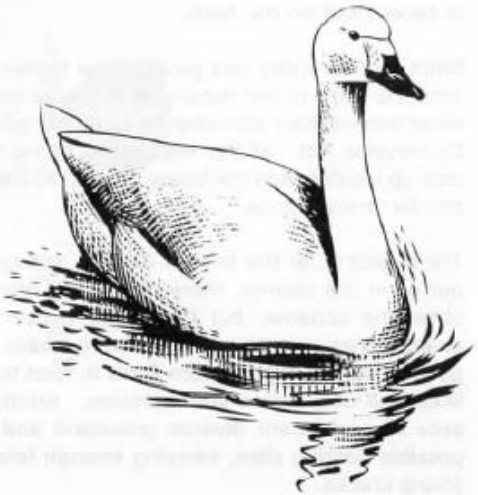

CONSERVING GLOUCESTERSHIRE'S BARN OWLS

John Hughes

In March 1982 the Farming & Wildlife Advisory Group (FWAG) and Gloucestershire Trust for Nature Conservation (GTNC) joined to set up a Nest Box Project for the Barn Owl *Tyto alba* in the county. The aim of the scheme was to provide farmers, and developers with suitable accommodation for the species to breed, compensating for the loss of its natural breeding sites, through loss of elms to disease, old hollow trees being cut down to meet public safety requirements imposed on landowners, and often redundant farm and industrial buildings in the county being converted to other uses or demolished completely. The bird reached very low numbers as a result of these factors and due to changes in agriculture, together with the increasing volume and speed of motor vehicles which had also taken their toll.

After consultation with the British Trust of Ornithology (BTO), the Severn Vale Ringing Group (SVRG) and the Ministry of Agriculture, Fisheries & Food (MAFF), Gordon McClone of GTNC found a sponsor to supply timber for two designs of boxes, an open tray with a central divider and a closed tunnel for new portaframe farm buildings. A volunteer of GTNC assembled the boxes and FWAG found a pig farmer at Badgeworth to store them. A press launch was made from Church House, Standish, inviting farmers and landowners to notify FWAG of Barn Owl sightings on and around the farms, and if possible to agree to accept nest boxes to be erected on the farm.

Strict confidentiality was given to the farmers to avoid people wishing to trespass onto the farm to the detriment of the farming business, but more importantly to avoid unnecessary disturbance to this Grade 1 listed species protected under the Countryside Act. All that was asked of the farmer was to note what, if anything, took up residence in the boxes. A GTNC free post envelope was given with each box for this purpose.

The project is, at the time of writing, still running and over 120 boxes have been put up in the county, there have been many more farmers who have offered to enter the scheme, but FWAG have been careful to select suitable sites, for example not too close to fast trunk roads and railway lines, both often having good habitat to support Barn Owls in food terms but being death traps through the likelihood of collision with vehicles. Another criteria we look at is for sufficient area of permanent diverse grassland and scrub within a three mile radius of possible nesting sites, carrying enough food to support the adults and broods of young chicks.

FWAG ask the farmers if water troughs are out in fields for animal stock to drink, to float a piece of wood in the trough, or in the new large round ones, an upside down plastic crate. These make it possible for the Barn Owl, who likes to bath, to get out of the water after falling in and becoming waterlogged. This is important as many birds have drowned in the county over the past decade.

The project does appear to have had some success as we get more reports of sightings of the bird although sadly mostly found dead on the roadsides. Farming has changed during the time of this team effort, it now has rotational and permanent set-aside, where a given percentage of the arable farm has to be left uncropped. This has been implemented in several ways in agreement with MAFF. For the Barn Owl we think it better to leave 15 to 20 m headlands around fields on a permanent basis, making for a diverse flora and fauna in areas of monoculture. The bird has a better chance of survival when hunting for small mammals at night on these sites. Interestingly, records of birds ringed by SVRG show us that the chicks disperse into other counties, one dead bird having been recovered on a railway line in Oxfordshire.

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COAL TITS, MARSH TITS AND THE BATSFORD NESTBOX SCHEME

J.D.Sells

Nestboxes were first constructed and erected in Bourton Woods by the local foresters during the late 1960s when Lord Dulverton was keen to compensate for the commercial development of the wood and to express his interest in wildlife in a tangible way. The first full year of monitoring was 1969 when Coventry Natural History Society became involved and the author has been responsible since 1972.

THE BATSFORD NESTBOX SCHEME

Bourton Woods are private woodland owned and managed by the Batsford Estate in a rural area. As a consequence disturbance by the public is minimal though the woods are used for other activities including paint ball war games. The woods cover 240 acres and are situated to the west of Moreton-in-Marsh and rise to 250 m in the Cotswold Hills. The soil is shallow brash overlying inferior oolite limestone.

HABITAT

The original mature oak-wood has been largely felled and replanted since the war but there are still wilder areas of mature natural trees with many individual trees remaining. Larch is the predominant plantation species though Beech has been widely planted and there are many other conifers including Norway Spruce, Scot's Pine, Douglas Fir and Grand Fir. The field layer in the plantations consists of typical spring flowers during the nesting season with carpets of Bluebells and Dog's Mercury. Later on some Bracken appears. Shrubs are more dominant under the natural trees with Hazel, Sycamore and Ash being the most common. The plantation trees, particularly Larch, have now reached the stage where felling and replanting are a regular occurrence though this was not so evident in the earlier years of the scheme.

As natural holes are limited it is reasonable to assume that the scheme monitors the majority of the resident tit population.

NESTBOXES

The boxes are mainly of a conventional design and the majority have been provided by the estate. They measure 10 cm square by 15 cm deep with a sloping lid which is readily removed. Entrance holes are 2.9 cm diameter which is sufficient to allow entry to all of the desired species. The depth of the box below the entrance hole is relatively shallow which may deter larger birds. Each box is fitted with a plastic baffle which, though somewhat incongruous, prevents entry by Weasels and deters Grey Squirrels and woodpeckers from enlarging the entrance holes. Predation was a serious problem at the beginning but has now been virtually eliminated.

A few additional boxes have been mounted from other sources with differing but similar designs.

METHODS

Nestboxes have been erected covering the majority of the wood but sited in areas where occupancy is found to be greatest. The number of boxes available has ranged from 64 in the first year to a maximum of 90 in 1994. Boxes are generally positioned fairly close to a path or ride for convenience but it has been noticed that such boxes are preferred to those located in the depths of the wood. No real attempt has been made to align them relative to the sun or prevailing winds. They are moved as plantations are felled or thinned, and replacements have been provided for losses over the years. Each box is typically mounted on a tree, 1.3 m above ground level to give easy access for observation. Originally boxes were attached by metal brackets but they are now simply tied with strong nylon cord. These boxes are inspected on a weekly basis from late April until the first broods are successfully reared in June. When possible sessions are held to ring the young and any convenient adults at the box. Nest record cards are completed for each occupied box where identification is possible and forwarded to the British Trust for Ornithology. Apart from this, the emphasis has been on maximising the benefit to the birds rather than attempting controlled scientific studies.

SPECIES USING THE NESTBOXES

The boxes have been used by five bird species - Blue Tit, Coal Tit, Great Tit, Marsh Tit and Wren and a summary of their total performance over the 28 years is shown in Table 1. These records do not include later broods by Wrens which have a very long breeding season. Other nestbox occupants have included a Natterer's Bat, Wood Mice, a Shrew, Common Wasps and a variety of slugs.

Table 1 shows how well Coal Tits and Marsh Tits perform compared with the other birds. Blue Tits and Great Tits suffer great losses once the young have hatched and have to be fed in an unfavourable habitat. Wrens are easily disturbed from nesting and are generally unsuccessful.

This report will now concentrate on the two less common and hence more interesting species and consider each in turn.

TABLE 1. Grand totals for all species 1969 - 1996

	Nests built	*Eggs laid*	*Young hatched*	*Young fledged*	*Young fledged per nest*	*Young fledged per egg*
Coal Tit	177	1577	1301	1207	6.8	0.77
Marsh Tit	158	1238	1004	811	5.1	0.66
Blue Tit	277	2358	1706	1188	4.3	0.50
Great Tit	82	585	413	294	3.6	0.50
Wren	82	217	112	74	1.9	0.34

COAL TIT

Table 2 shows the key figures for the nesting records of Coal Tits for the years of the scheme. The first row contains the number of Nest Record Cards received by the BTO and the second row indicates the number of identified nests monitored in the nestboxes. Other figures are self explanatory.

The mainly coniferous habitat should suit the Coal Tit and the records indicate that this species is well represented and has shown a slight tendency to increase in numbers. It is the earliest species to commence nesting and as a consequence often has second broods. These are included where they have nested in time for them to have been picked up by the regular visits but are not distinguished separately in the table. Therefore some bias occurs where later broods have not been monitored. Coal Tits have an outstanding breeding success rate with very few losses now that the boxes are protected.

The Coal Tit is the smallest member of the family and is also the first to commence laying. This date depends almost entirely on the weather, both current and earlier in the year. The earliest clutch ever was started on 9 April 1993 but the average is 20 April. Nearly every normal clutch contains 10 eggs but up to 12 eggs have been recorded.

There have been just three ringing recoveries all from within the wood. An adult female ringed in 1982 was caught again the following year in the same nestbox. A similar bird trapped in 1983 was found in 1984 having moved to the nearest box 80 m away. More interesting was a female nestling ringed in 1989 that by the next year had moved 1,000 m to a box at the far end of the wood to raise its own brood. This indicates that younger birds have to distance themselves from their

TABLE 2. Coal Tit breeding statistics 1969 - 1978

Year	*BTO NRCs*	*Batsford nests*	*Largest clutch*	*Average clutch*	*Total eggs*	*Young hatched*	*Young fledged*
1969	95	7	11	9.7	68	52	52
1970	77	4	10	9.3	37	25	22
1971	117	5	9	7.8	39	30	30
1972	91	3	10	8.7	26	0	0
1973	92	10	9	7.6	76	60	60
1974	105	7	11	9.4	66	32	32
1975	162	5	9	7.2	36	14	0
1976	73	7	10	9.1	64	49	44
1977	85	6	9	8.0	48	35	18
1978	94	6	10	9.0	54	49	48
1979	88	8	12	9.7	78	71	71
1980	82	6	11	9.7	58	47	47
1981	81	8	10	8.6	69	62	60
1982	73	2	10	9.5	19	18	18
1983	95	8	10	8.8	70	56	30
1984	78	4	10	9.5	38	34	34
1985	139	4	9	8.5	34	34	32
1986	109	2	10	10.0	20	19	19
1987	148	5	11	9.6	48	46	43
1988	156	3	8	7.0	21	21	21
1989	140	4	10	9.3	37	37	36
1990	157	13	10	9.5	123	95	94
1991	149	7	9	7.9	55	46	45
1992	135	9	12	9.8	88	86	86
1993	136	11	11	9.1	100	89	89
1994	133	12	11	8.6	103	95	79
1995	101	6	11	9.5	57	55	54
1996	?	5	10	9.0	45	44	43
Total	2991	177	12	8.9	1577	1301	1207

their parents' territories which may include several boxes.

From 1969-1995, 172 nest record cards of this species have been forwarded to the BTO compared with a total number received by them of 2,991. Thus the scheme accounts for 5.7% of all records, a creditable proportion.

In spite of the efforts to improve the occupancy of the boxes the figures show that usage is fairly random with between 2 and 13 nests. Variations are probably weather related.

TABLE 3. Marsh Tit breeding statistics 1969 - 1978

Year	*BTO NRCs*	*Batsford nests*	*Largest clutch*	*Average clutch*	*Total eggs*	*Young hatched*	*Young fledged*
1969	28	2	8	8.0	16	12	12
1970	28	5	9	8.0	40	17	17
1971	34	5	8	6.6	33	18	18
1972	54	4	10	9.3	37	34	14
1973	37	9	9	7.7	69	54	54
1974	47	9	9	7.3	61	24	24
1975	55	4	8	7.0	28	15	6
1976	47	11	10	8.9	95	79	53
1977	33	10	8	7,3	73	59	31
1978	36	15	9	7.7	116	94	83
1979	23	7	10	9.1	64	50	50
1980	30	8	9	7.4	59	52	51
1981	28	7	8	7.7	54	54	43
1982	29	8	9	8.4	67	58	47
1983	22	5	9	7.8	39	34	27
1984	13	3	8	7.7	23	20	8
1985	35	4	10	8.8	35	24	23
1986	24	4	8	7.8	31	31	31
1987	32	4	9	8.8	35	34	34
1988	31	5	9	7.6	38	38	36
1989	35	5	9	8.2	41	41	32
1990	43	5	9	8.4	42	37	37
1991	32	4	8	7.5	30	22	14
1992	28	2	8	8.0	16	16	14
1993	33	1	8	8.0	8	8	8
1994	45	5	9	7.8	39	39	18
1995	35	5	9	7.0	35	34	20
1996	?	2	8	7.0	14	6	6
Total	917	158	10	7.8	1238	1004	811

MARSH TIT

Table 3 shows similar information as for the Coal Tit above. This species is a speciality of the scheme as very few records are otherwise received by the BTO. Unfortunately the higher figures of earlier years had declined almost to the point of disappearance by 1993 but there are indications recently of an improvement and reasons to be more optimistic. Although the reference books suggest that Marsh Tits have a strong preference for broad-leaved woodland, the majority of sites chosen here are in the Larch plantations. This tree of course is not an evergreen and they have not been planted as densely as Spruce or other conifers would be. The availability of Beech mast may also be relevant. Like the Coal Tit, the Marsh Tit is also very successful at raising young and losses are usually due to serious circumstances rather than simply poor weather or apparent lack of food supply.

The Marsh Tit is also an early nester with the record being 13 April 1990 and an average date of 21 April. Clutch size is usually 8 or 9 eggs but 10 eggs have occasionally been laid.

There have been six ringing recoveries for Marsh Tits again all from within the wood. Three adult females trapped in 1982 were re-trapped the following year having moved distances up to 150 metres to one of the nearest boxes. A female was monitored similarly in 1983/84 and another female was found dead in 1989 having been ringed the previous year in an adjacent box. A female nestling ringed in 1990 travelled 825 metres to build its own nest the following year for the same reasons as the Coal Tit above.

From 1969-1995, 156 nest record cards of this species have been forward to the BTO compared with a total number received by them of 917. Thus the scheme has accounted for 17% of all records, a highly significant proportion and in 1990 the scheme had the honour of submitting the 1000th record card for Marsh Tits.

CONCLUSIONS

The future of the scheme depends on the future of the wood and the availability of effort to monitor and maintain the nestboxes. As a key and unusual habitat for Marsh Tits in particular it is hoped that Bourton Woods and its birds continue to thrive.

ACKNOWLEDGEMENTS: Thanks are due to the Batsford Estate for their co-operation and support over the many years of the Scheme.

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ORIGINS OF SISKINS WINTERING IN GLOUCESTERSHIRE

Robin M. Sellers and Philip L. Williams

The numbers of Siskins *Carduelis spinus* wintering in Gloucestershire have increased substantially over the past 15-20 years. This has been particularly evident in gardens throughout the county, to which the birds resort from about January to March inclusive, in search of peanuts. In fact the birds probably arrive in Gloucestershire well before this, but are less conspicuous at this time because they keep to areas where they can collect their preferred natural foods, the seeds of alder and other trees.

Their regular occurrence in gardens has made Siskins an obvious target for bird ringers and quite large numbers have been ringed in recent years. The recoveries from these form the basis of this analysis of the origins of Siskins wintering in Gloucestershire.

METHODS

There are no accurate figures for the number of Siskins ringed in Gloucestershire but the total is probably in excess of 2,500 birds. The majority of these were caught at four main sites, a garden at Walkley Wood, Nailsworth operated by RMS since 1981, a garden at Burleigh operated by PLW between 1984 and 1989, a garden at Amberley operated by PLW since 1989, and a garden at Drybrook operated by PLW intermittently since 1984. Smaller numbers of birds have also been caught in gardens at Chipping Campden, Dursley, King's Stanley, Stroud and Woolaston Common, and at other types of site at Frampton-on-Severn, Longhope and Sandhurst. Resulting from this ringing there are on file some 105 recoveries (birds found dead) or controls (birds caught alive by other ringers). Of these, 46 are local movements within Gloucestershire and give no information about the birds' origins; the analysis which follows is based on the remaining 59 recoveries and controls.

Siskins are usually double brooded and have a breeding season extending from April to August. Southward migration does not usually begin until somewhat later than this, however, after moult is complete, so any Siskin handled between April and September is potentially on or near its breeding grounds (Cramp & Perrins 1994), and this has been the main means by which breeding areas were identified. However, we have also taken into account the direction of travel (especially for birds in S.England ringed and retrapped or recovered in the same season) as giving a broad indication of whether the birds were heading for or coming from Scotland/N.England or the continent.

RESULTS

Figure 1 shows the sites of handling outside Gloucestershire of all Siskin ringing returns showing a movement into or out of the county. These include 26 (44%) to or from Scotland, 1 (2%) to Wales, 6 (10%) to or from the continent (one each in the Channel Islands, Belgium, Netherlands, Czechoslovakia, Norway and Lithuania) and 26 (44%) to or from other parts of England.

Table 1 shows the dates of handling of these birds in Gloucestershire. With one exception, they were all in the period December to April, with the majority in February and March. The exception concerns a bird ringed in Gloucestershire in June and presumed to have been breeding close to where caught, and recovered in July two years later in Selkirkshire, Scotland. From the timing of its recovery this bird appears to have been breeding at the latter location. The habit of changing breeding areas in this way has been noted in other irruptive species, such as the Common Crossbill *Loxia curvirostris* (Newton 1972).

The dates of handling of these same birds outside Gloucestershire are summarised in Table 2. The handlings in Scotland all fall in the period March-July inclusive and appear to involve either breeding birds (May-July handling dates plus some from April) or birds caught in the immediate pre-breeding season (March and some April records). The latter are likely to have been close to their breeding grounds, though we cannot exclude the possibility that they may have moved further afield to breed. Either way, it is clear that a substantial proportion of the birds wintering in Gloucestershire originate from Scotland.

The position with the three handlings in N.England and single bird in N.Wales is similar, and these appear to involve birds breeding or preparing to breed in these areas, though could possibly be birds on passage to or from further north in the case of the three birds in N.England.

By contrast the handlings in S.England appear to involve primarily birds in their winter quarters (January-March records), or in transit between their wintering and breeding areas (some March/April records). The latter group can be subdivided as follows:

(i) Birds caught to the north of Gloucestershire and apparently in transit to or from breeding grounds in Scotland or northern England (birds caught in Warwickshire (1), Shropshire (1), Nottinghamshire (1) and Lincolnshire (1));

(ii) Birds caught to the east of Gloucestershire and apparently in transit to or from breeding grounds on the continent (birds caught in Berkshire (1), Buckinghamshire (1), Essex (1), Hertfordshire (1), Kent (1), Norfolk (2), and Surrey (1) and especially including birds caught and recaptured or recovered

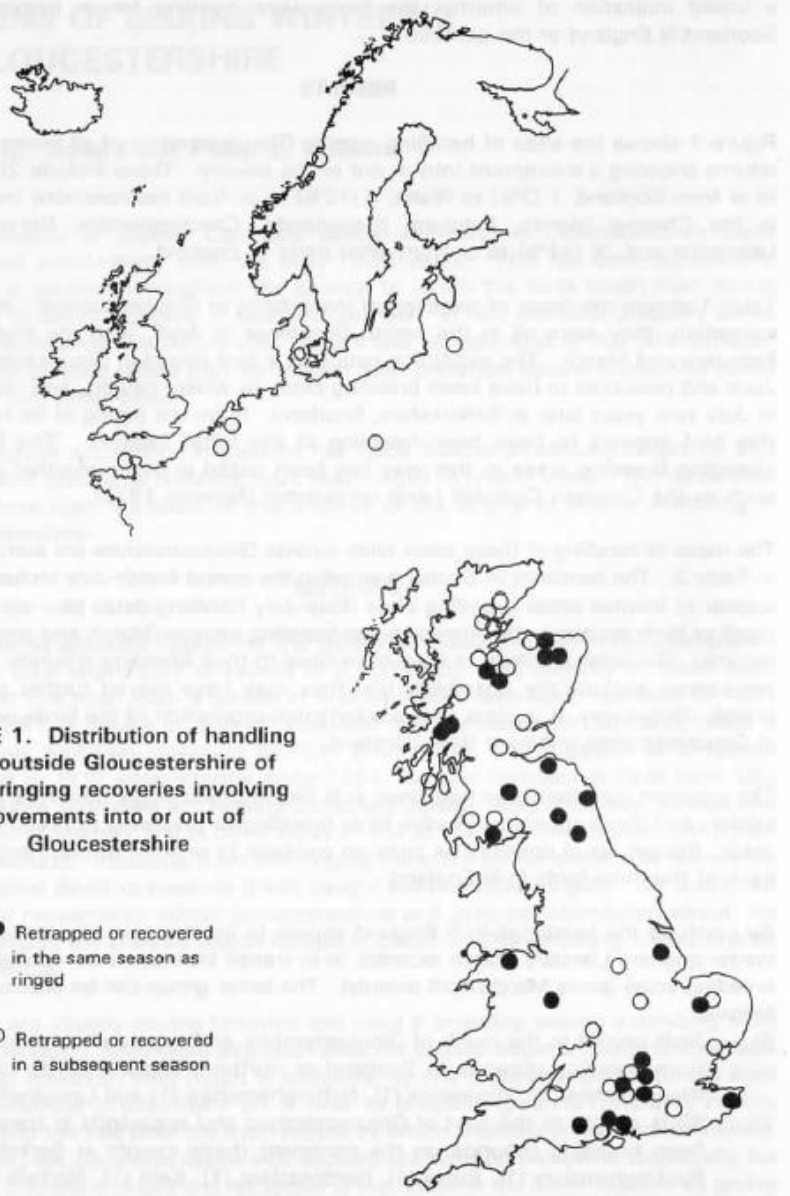

FIGURE 1. Distribution of handling sites outside Gloucestershire of Siskin ringing recoveries involving movements into or out of Gloucestershire

● Retrapped or recovered in the same season as ringed

○ Retrapped or recovered in a subsequent season

TABLE 1. Dates of handling in Gloucestershire of Siskin ringing recoveries involving movements into or out of the county [a]

	England	*Wales*	*Scotland*	*Outside Britain*	*All*
Dec	1	-	1	-	2
Jan	2	1	2	-	5
Feb	9	-	13	2	24
Mar	13	-	8	3	24
Apr	2	-	2	1	5
Jun	-	-	1	-	1
Totals	27	1	27	6	61

a Two birds handled twice in Gloucestershire in different months are included twice.

TABLE 2. Dates of handling outside Gloucestershire of Siskin ringing recoveries involving movements into or out of the county [a]

	S.England	*N.England & N.Wales*	*Scotland*	*Outside Britain*
Jan	2	-	-	-
Feb	5	-	-	-
Mar	8	-	6	-
Apr	7	3	9	1
May	-	1	6	-
Jun	-	-	3	-
Jul	-	-	1	1
Oct	-	-	-	3
Nov	-	-	-	1
Dec	2	-	-	1
Totals	24	4	25	6

a Bird ringed in Gloucestershire in June and recovered on Scotland in July excluded.

in the same season);

(iii) birds caught in counties nearer to Gloucestershire and/or in different seasons, and whose origins are more difficult to infer (Avon (1), Berkshire (1), Buckinghamshire (1), Dorset (1), Hampshire (4), Leicestershire (1), Surrey (1) and W.Sussex (1); note that some of these are birds recaptured or recovered in a later season than that in which ringed and may be birds which have switched wintering areas between seasons).

In addition there have been six movements involving birds handled outside Britain. These included birds in the Channel Islands (ringed in October), the Netherlands (caught in April), Belgium (November), Czechoslovakia (October), Lithuania (October) and Norway (July). Only the last of these was clearly on or near its breeding grounds, though it seems likely that this is also true of the Lithuanian bird; the Czechoslovakian bird may have been from the local breeding population or a bird which had switched wintering areas between seasons; the remainder were probably caught on passage, though Siskins do breed in both the Netherlands and Belgium, and these may also have been local breeding birds (Hagemeijer & Blair 1997).

DISCUSSION

From the ringing results currently available it is clear that the Siskins wintering in Gloucestershire originate from both the British (mainly Scottish) and continental breeding populations. Overall, 33 of the movements seem to relate to the British breeding population (of which at least 25 are likely to be of Scottish origin), and 13 to the continental population; 11 cannot be so assigned with confidence. Foreign birds are likely to be somewhat under-represented partly because fewer Siskins are ringed abroad than in Britain but also because the chances of getting recoveries or controls is likely to be lower. With this in mind it seems that on average at least 25% of the birds wintering in Gloucestershire originate from the continent with the remainder drawn mainly from Scotland. Of course the ratio may vary from year to year, but the data available are not extensive enough to investigate this point in detail.

Siskins increase weight substantially before migrating, and a study carried out in Gloucestershire has shown that this amounts on average to about 2 g, which is sufficient to enable the birds to fly 400-500 km with no assistance from the wind (Sellers 1986). This would allow birds to return to breeding grounds in Britain in essentially one flight, but birds from Fenno-Scandia would only be able to reach the Low Countries, where they would be obliged to 'refuel'. These conclusions are entirely consistent with the ringing recoveries described above.

ACKNOWLEDGEMENT: We are indebted to the Severn Vale Ringing Group for access to their ringing recoveries and to Dr M.V.Hounsome for making available his Gloucestershire Siskin recoveries.

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COLOUR-RINGED LESSER BLACK-BACKED GULLS IN GLOUCESTERSHIRE

John D. Sanders

The habits of the Lesser Black-backed Gull *Larus fuscus* have changed greatly in the last fifty years. In the British Isles the species was formerly almost entirely a coastal breeding summer visitor, migrating in the autumn down as far as the north-west coast of Africa. But now far greater numbers over-winter, having become adapted to feeding on waste food at landfill sites. The largest concentrations occur in England, in an area extending from Lancashire and Yorkshire in the north to the London region and the Severn in the south. A national survey in the winter of 1949-50 recorded about ten birds in the whole of Gloucestershire (Barnes, 1952), while the report of a repeat survey in 1959-60 mentioned a 'considerable population round Cheltenham and Gloucester totalling, perhaps, 150-200 birds' (Barnes 1961). Subsequently a count in January 1983 noted 5,869 Lesser Black-backs roosting on the upper Severn estuary (Bowes *et al.* 1984). The Severn Estuary Gull Group has attempted to monitor the roost off the New Grounds, but has encountered the perennial problem of trying to identify and count huge numbers of flying gulls in fading winter light. However, their peak count was just under 25,000 large gulls in November 1989 (Durham 1989). Given that just a few tens were likely to have been Great Black-backed Gulls and something over ten per cent Herring (based on personal counts at landfill sites), then the number of Lesser Black-backs would seem to have been over 20,000. I suggest that this is a high figure and that the normal wintering population in the County lies between 10,000 and 20,000.

Changes have also occurred in the breeding colonies and distribution. Monaghan in the New Atlas of Breeding Birds (Gibbons *et al.* 1993) records increases at Orford Ness in Suffolk, but also declines at many coastal and inland sites. On Skomer Island, for instance, breeding failures have been attributed to a decline in fish waste from Irish Sea trawlers and the closure of a rubbish dump at Haverfordwest (Rock 1994). Yet rooftop colonies increase in size and new towns are occupied year by year. In Bristol the species first nested in 1972. By 1980 there were 100 pairs and 500 in 1993. Breeding success is exceptionally high, with 2-3 chicks being reared by each pair per year (Rock 1994). This has not just occurred in Britain, but in The Netherlands too, where, for example, several thousands now nest around the port installations in Rotterdam. In Gloucester City nesting first occurred in the late 1960's. 7 pairs were recorded in 1969 and 80 in 1976 (Monaghan & Coulson 1977). After an initial rapid increase there has now been some stabilisation, due to a large extent to culling and control measures, but

there is still a thriving colony of a few hundred pairs, the main concentrations being in the city centre, by Eastern and Cole Avenues, at Innsworth and on the roofs of the old RAF depot buildings at Hardwicke and Quedgeley. A few pairs also nest on buildings in Cheltenham and in the outskirts of Tewkesbury.

It was a birdwatching holiday in Morocco that first alerted me to the fact that a significant proportion of Lesser Black-backed Gulls of the race *L.f.graellsii* carry colour-rings. For a week in early April 1994 I studied a roosting flock of about 2,000 birds on the estuary at Oued Sous, just to the south of Agadir, and in this time I found 29 birds with colour-rings. The largest group came from The Netherlands, where up to about 2,000 are ringed annually, but the rest had been marked at several sites in Britain and Ireland, including one from Gloucester. I quickly realised that here was the basis for an interesting study and started my observations in Gloucestershire in mid-August 1994. The study still continues and I have included here my results up until the end of August 1996.

The aims of the study were to find and identify as many colour-ringed birds as possible and to keep a log of their presence in the County in order to gain information on their movements. The best location for observations was found to be the Gloucester Landfill Site at Hempsted, 51°51'N 2°16'W, since large numbers of Lesser Black-backed Gulls visit the area each day and one can get close enough to them to identify rings. There are other landfill sites at Stoke Orchard, near Bishop's Cleeve, but since there are three tipping areas the birds are more spread out. There is also a small tip at Frampton-on-Severn which offers good viewing opportunities, but fewer birds and more disturbance. Most of the gulls in the County roost on the estuary off the New Grounds, but rarely is one able to get close enough to read rings. Other sites have been visited in neighbouring counties and two further trips made abroad. Details of all areas visited are listed below:

Gloucester Landfill Site	292 visits
Frampton-on-Severn Landfill Site	36
Stoke Orchard Landfill Sites	3
Gloucester City rooftop colonies	5
Longney Point, River Severn	4
Frampton-on-Severn shore	3
Purton Water Works	6
Calne Landfill Site, Wiltshire	9
Pit 68, Cotswold Water Park, Ashton Keynes, Wiltshire	7
Barrow Gurney, Bristol Water Works, North Somerset	7
Portugal (with Peter Rock)	21 - 27 Oct 95
Agadir, Morocco	1 - 8 Apr 94
	7 - 13 Jan 95

My method at the main site at Gloucester is to observe the gulls through a

telescope for a minimum of four hours daily (weather permitting) on as many weekdays as possible. Weekends are not so productive since less tipping occurs at these times, there is less food available and hence there are fewer birds. In just over two years I have averaged slightly under six visits per half-month, with a maximum of 11 and a minimum of nil. Figure 1 below illustrates the number of visits made. The horizontal axis is divided into half-months (1st to 15th of each month inclusive and 16th to the end of each month) and the vertical axis shows the number of visits made per half-month. The gaps are due to holidays, notably in late April 1995 and late October/early November 1995.

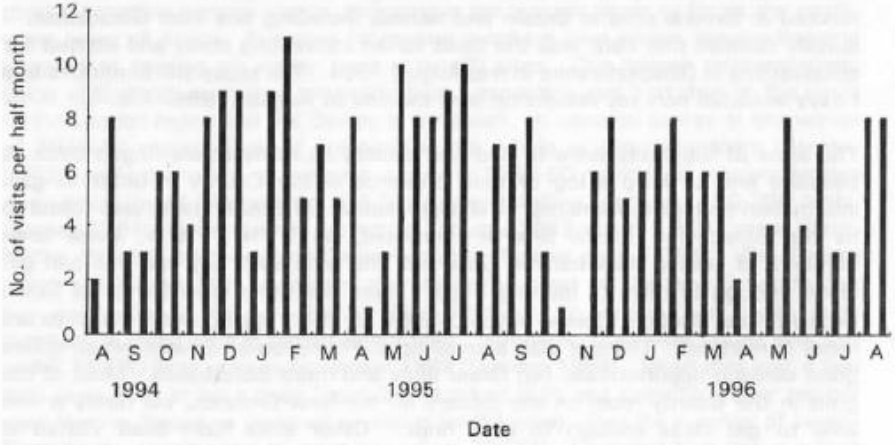

FIGURE 1. Frequency of visits to Gloucester Landfill Site

The lengthy observation times are necessary since there are continuous movements of birds to and from the tip. At Gloucester the gulls form a loafing flock some distance away, often on the other side of the River Severn on Maisemore Ham. In this situation they are very wary and will not allow a close approach. Added to this they stand or sit in short grass so that the rings are impossible to identify. At intervals during the day groups fly into the tipping area to feed and it is at these times that they are more confiding and easily approached. On several occasions I have visited the tip in the morning, returned home for lunch and then made a second visit during the afternoon. In the morning I will have seen perhaps a dozen birds with rings and yet in the afternoon there will be ten or a dozen different birds, with only a few resightings of previously recorded individuals. I am further able to demonstrate these bird movements by making early morning visits to Frampton-on-Severn Landfill Site, about 12 kms to the south. This lies close to the main estuary roost and birds I see here often arrive

at Gloucester later in the day. One bird at Frampton at 0930 hr had arrived at Gloucester by 1050 hr. This also shows how difficult it is to make meaningful counts of birds visiting the area daily. 1,000 or more, mainly immatures, may be present at one time during the summer and about 3,000 in the winter, but these figures should probably be doubled to give more realistic estimates.

Having decided the best observation site the second problem was how to identify the colour-rings from the many different schemes, the ingenuity of the gull ringer knows no bounds! Basically rings can be divided into two types, year rings and individually coded rings. With year rings the same design ring is placed on a large number of birds; generally the colour indicates the year of ringing and any inscription the ringing site. Individually coded rings fall into two groups, those with unique inscriptions (with different colours often denoting the years of ringing) and those with a unique combination of up to four colours plus a metal ring. Table 1 lists the sites of colour-ringing schemes known to me, together with details of the rings used and ages of birds ringed.

TABLE 1. Lesser Black-backed Gull colour-ringing schemes

		Indivually coded rings		*Ages of birds ringed*	
Site	*Year rings*	*Colour combination*	*Inscription*	*Pullus*	*Full grown*
Gloucester	✓		✓	✓	
Bristol			✓	✓	
Hereford			✓	✓	
Flat Holm	✓	✓	✓	✓	✓
Lundy	✓			✓	
Skomer	✓	✓			✓
North Wales			✓	✓	
Walney Island		✓		✓	
Manchester		✓			✓
Lancaster		✓			✓
Orford Ness			✓	✓	
Glasgow area		✓		✓	✓
Isle of May		✓			✓
Rep. Ireland	✓			✓	✓
Spain			✓		✓
The Netherlands			✓	✓	✓
Norway			✓	✓	

Immediately the limitations of a study such as this become apparent. Birds are colour-marked at only a relatively small number of sites and if one plots the origins of observed birds then one simply ends up with a map of the various ringing schemes. The large numbers of gulls from Northern Europe, for instance, that visit Gloucestershire during the winter time just will not be accounted for. However, on the plus side, having large numbers of gulls that are individually marked and readily identifiable at long distances offers enormous advantages over conventional metal ringing in that information on movements of single birds can be more readily obtained.

When visiting the Gloucester Landfill Site it is easy to assume that the same birds are present on the tip daily, they nest on the roofs in the city and come down on to the refuse to feed. But after only a short time of observing colour-rings this assumption is quickly dispelled, as one is continuously seeing new birds. In just over two years I have recorded 373 individually marked Lesser Black-backs. Of these no less than 115 have been seen on only one occasion and 303 (just over 80%) less than ten times. There are only a small number of 'regulars', White 2 UZ from Bristol, ringed in 1992, for instance, has been logged 101 times. Birds that have been seen ten or more times are mainly breeding adults in the Gloucester City rooftop colonies, while the others are winter visitors, passage migrants and immature non-breeding individuals. This does indicate how much movement is taking place by birds that are not nesting in the immediate area.

Sightings made at both Gloucester and Frampton-on-Severn Landfill Sites are represented in Figure 2 below. The vertical axis shows the number of individuals

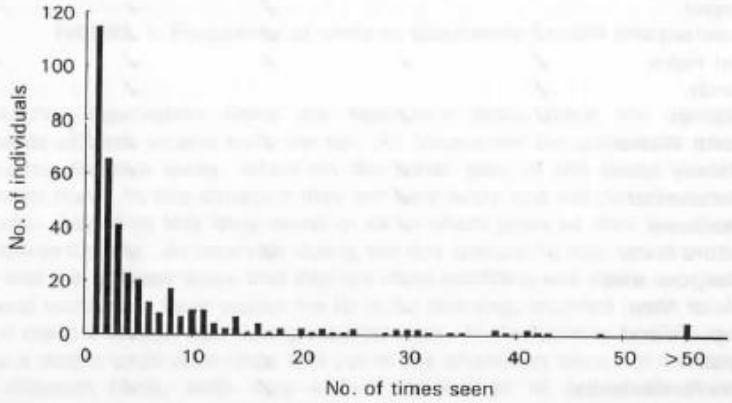

FIGURE 2. Frequency of occurrrence of individually marked birds at Gloucester and Frampton-on-Severn Landfill Sites

seen between August 1994 and August 1996 inclusive and the horizontal axis records the number of times that they have been seen.

CITY OF GLOUCESTER MARKED LESSER BLACK-BACKED GULLS

Unfortunately nestlings were individually marked in only one year, 1995 (previously only year rings were used), so there is only a limited amount of data to work on. Figure 3 below illustrates my observations. The horizontal axis records the period July 1995 to August 1996 divided into half-months (from 1st to 15th inclusive and from 16th to the end of each month). The vertical axis shows the number of individuals seen in each half-month.

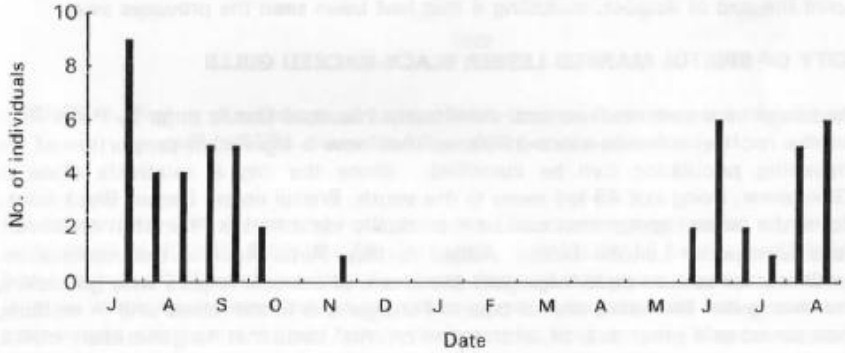

FIGURE 3. Sightings of Lesser Black-backed Gulls ringed in Gloucester

68 pulli were marked in early July 1995 and it can be seen that nine quickly arrived on the tip at the end of the month. But in August the indications are that there was a sharp fall. I believe this to be real, since my observations indicate that a proportion of young birds quickly move away from the nesting areas. In 1996, for instance, the first juveniles from The Netherlands and the island of Flat Holm in the Bristol Channel arrived in the County on August 9th, from Bristol on 12th, Orford Ness in Suffolk on 20th and the city of Hereford on 27th. Impressive as these movements are they are still eclipsed by a juvenile Dutch bird that reached south-west France on 27th July (N. van Swelm pers. comm.) and young birds are regularly seen in Portugal before the end of August (Rock 1994). Although some birds move quickly away, others remain in the general area until early October, but by the winter months most have gone, there being just one isolated sighting in late November. Where do they go? This question is quickly answered by an autumn trip to the fishing ports on the Atlantic coast of Portugal. I made a visit for a week in late October 1995, guided by Peter Rock. To my eyes the Portuguese seem

very careless in the way that they handle fish, they drop large numbers on to the quays and leave them in open boxes, it makes for a veritable paradise for gulls! In one port alone we estimated 40,000 large gulls, mainly Lesser Black-backs and Yellow-legged *Larus cachinnans*. Most were young birds and, out of over 170 Lesser Black-backs that were identified during the week by colour-rings, 82 were juveniles, including four from Gloucester, none of which had been seen by me after fledging. Many of these birds later in the season move south into Morocco and on my two trips there I saw 25 first winter birds out of a total of 49.

Figure 3 shows that first-summer birds returned to the general breeding area from early June 1996. They do not enter the occupied territories in the rooftop breeding colonies, being swiftly driven off by the adult birds if they go anywhere near. 20 out of the 68 ringed were identified on the tip in 1995 and 9 in 1996 up until the end of August, including 4 that had been seen the previous year.

CITY OF BRISTOL MARKED LESSER BLACK-BACKED GULLS

Nestlings have been marked with individually inscribed Darvic rings by Peter Rock in the rooftop colonies since 1980, so that now a significant proportion of the breeding population can be identified. Since the city is relatively close to Gloucester, being just 49 km away to the south, Bristol ringed Lesser Black-backs form the largest group that can be individually identified at Frampton-on-Severn and Gloucester Landfill Sites. Added to this, Peter Rock is the national co-ordinator for colour-ringed large gulls and is one of the few ringers who go looking for their gulls. He makes annual trips to Portugal and further afield and in so doing has amassed a great deal of information on 'his' birds that he generously makes freely available to fellow interested observers.

Bristol juveniles start to arrive in small numbers in the County from mid-August onwards, nine being identified in 1994 and seven in 1995. I have gained the impression that they are reluctant to move north in their first autumn having seen 47 colour-ringed juveniles on three visits in late July and early August at Barrow Gurney, about 7 km to the south of Bristol. The birds that remain in Britain in August and September move around quite extensively, however, two birds being proved to make rapid movements between Gloucester and Calne in Wiltshire, approximately 52 km to the south-east, in 1995. One of these was at Calne Sandpits on Sept 28th, Gloucester on 29th and then back at Calne again on Oct 5th. Many of these juveniles that roam around southern Britain move south on to the Continent in late September and early October. In 1995 Orange 3's PH, last seen at Gloucester on September 21st and TV, last seen on September 22nd, were found in Portugal on October 25th and 21st respectively.

Figure 4 below represents the sightings in Gloucestershire, until the end of August 1996, of Bristol pulli that were ringed in June and July 1994. The horizontal axis records the dates in half-months and the vertical the number of individuals seen

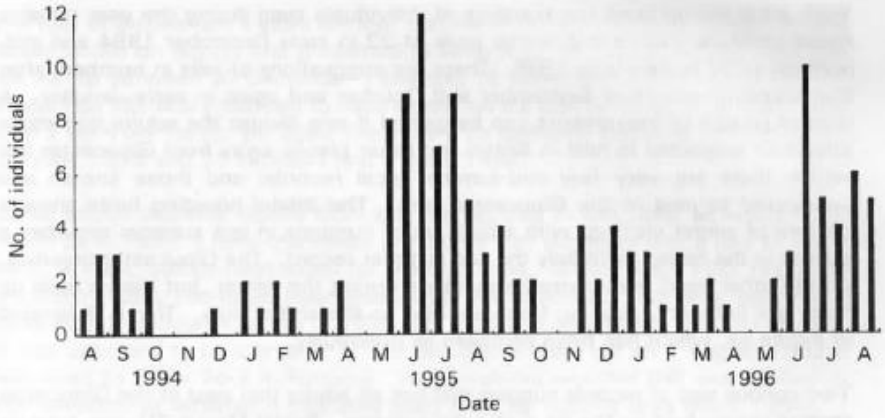

FIGURE 4. Timing of sightings of Lesser Black-backed Gulls ringed in Bristol as pulli in 1994 (Bristol Black 2 series, ringed as pulli in 1994)

per half-month. The Figure shows that, as for Gloucester ringed birds, there is a large return to the area from late May onwards, with up to 12 first-summer birds being seen in a half-month period. Numbers dropped in August, but more tended to linger in the early winter than in the previous year. Just the odd one or two are seen in late winter and spring, before the return again from mid-May of second-summer birds. This pattern of sightings continues for older birds, so repeat tables are not necessary, although there is evidence that more third-winters remain during the winter months, up to seven being seen in late January and early February 1996, for instance. Some start to establish territories and nest in their third summers. One notable individual was on a roof in Bristol at lunch-time on 4 April 1995 and on the tip at Gloucester in mid-afternoon of the same day, so presumably there is much movement and exploration of potential nest sites at this age.

To demonstrate how movements of individual birds can be monitored by colour ring observations Bristol Yellow GK, ringed in 1993, is of particular interest. On 25 October 1993 it was at Matozinhos fishing port in Portugal, 41°11'N, at Gloucester Landfill Site from 26 June to 2 August 1995, at Cape Gata, Almeria, Spain, 36°52'N on 6 Apr 1996 and back at Gloucester from 14 May to 28 June 1996. Bristol Black 2 PJ, on the other hand, shows how birds change their wintering areas as they become older. Ringed in 1994 it was at Gijon, Spain, 43°32'N, on 25 February 1995, yet just over a year later, on 27 February 1996, it was at Gloucester Landfill Site.

With adult Bristol birds the numbers of individuals seen during the year remains more constant, with a mid-winter peak of 22 in early December 1994 and mid-summer of 26 in June/July 1995. There are suggestions of falls in numbers after the breeding season in September and October and again in early January. A clearer picture of movements can be gained if one divides the adults into those known or suspected to nest in Bristol and other places away from Gloucester (for which there are very few mid-summer local records) and those known and suspected to nest in the Gloucester area. The Bristol breeding birds show a pattern of winter visiting, with a build up of numbers in late summer and then a decline in the spring, with only the odd summer record. The Gloucester breeders, on the other hand, show smaller numbers during the winter, but then a build up from late February, peaking from late May to the end of July. This is illustrated in Figure 5a, which has been compiled as previously.

Two curious sets of records suggest that not all adults that nest in the Gloucester rooftop colony feed on the tip during the summer. Bristol Mauve TU was seen on

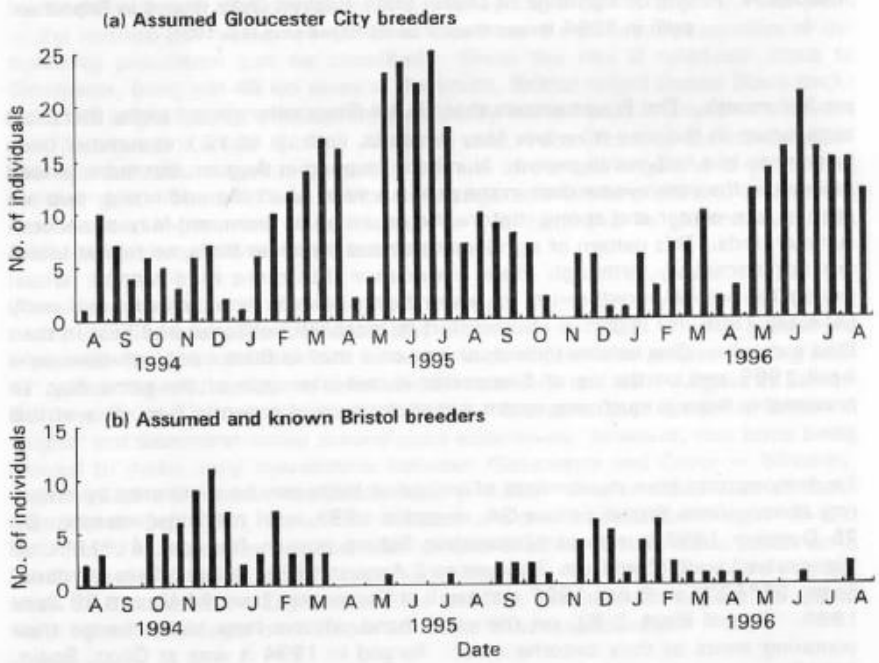

FIGURE 5. Timing of sightings in adult plumage of Lesser Black-backed Gulls ringed in Bristol

the roof of Debenham's store on four occasions in April and May 1995. It was sexed female on display and presumed to have bred, yet there were no sightings on the tip between 20 December 1994 and 18 November 1995. Another bird, Bristol Red YB, was presumed to have nested on the roof of Gloucester Prison less than 2 km from the tip, yet again there were no sightings between 14 March and 26 June 1995 and 21 February and 4 June 1996.

Some adults disperse rapidly from the nesting area in late July, as indicated in Figure 5a in 1995. I have one series of records that suggests that a few of these birds, at least, quickly head south for the Continent. Bristol Black 1VD, ringed as a pullus in 1986, has never been seen in the winter months, but was regularly at Gloucester from March to July in 1995 and 1996 and sexed male from its display. It was assumed to be a breeder in the Gloucester area, yet on 5 August 1992 it was seen by Peter Rock in Portugal. He postulated whether this was a failed or non-breeder, or whether it migrated early from its nesting area (Rock 1994). I suggest that some birds, such as the one above, habitually move quickly south after nesting and have further evidence to support this (see Isle of May birds below). Other adults evidently leave later. Bristol Brown YX, ringed in 1990, was at Gloucester Landfill Site on 23 August 1994, yet has been seen in Portugal on Oct 29th 1993 and 2nd Sept 1995. Another individual demonstrates how wintering areas can change. Bristol Red CV, ringed in 1987, was reported at Fuengirola, near Malaga in southern Spain on 7 January 1992, yet in the winter of 1994/95 it was seen at Gloucester on five occasions between 16 November and 2 February.

WINTER VISITORS

Winter visitors and passage migrants start to arrive in relatively large numbers in Gloucestershire in mid-August. This coincides with a rapid departure of local breeding birds so, were it not for the evidence of colour-rings and the fact that many of the new birds are darker mantled and presumably of the race *L.f.intermedius*, the arrival of these individuals would not be readily apparent. Fewer carry rings so less data are available, but adult breeding birds have been colour-ringed in a study area on the Isle of May in the Firth of Forth in Scotland, the occurrences of which in the County are illustrated in Figure 6 below. Because the sample is so small I have combined the two years sightings into one. The presentation is very crude, but I believe it is sufficient to demonstrate the situation. Since only breeding birds are ringed, as one might anticipate, none is seen during the summer months. That some quickly move away from the nesting area in early August is clearly shown and in this respect one bird has been particularly consistent, having been first seen on Gloucester Landfill Site on 15 August 1994, 15 August 1995 and 14 August 1996, with subsequent sightings through the two winters until January/February. These early movements south can be compared with those suggested for the Bristol bird Black 1VD, noted above. Other Isle of May birds move south to the Continent and on to Morocco

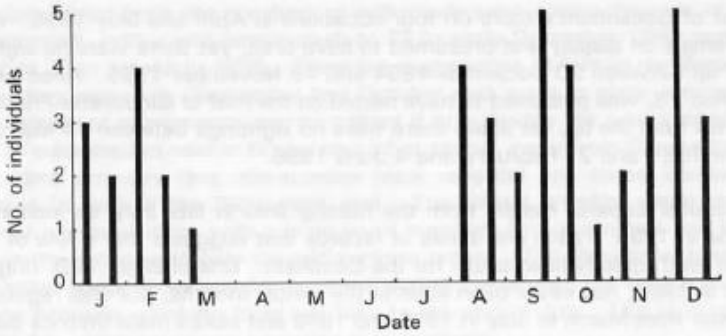

FIGURE 6. Timing of sightings of Lesser Black-backed Gulls ringed on the Isle of May

during the winter. One bird that I saw near Agadir on 12 January 1995 was at Calne Landfill Site from 5 to 18 October 1995 and in the Cotswold Water Park (West) on 17 November (K.J.Grearson pers. comm.), suggesting that some remain in southern Britain during the autumn before moving on.

Breeding birds have also been colour-ringed on the islands of Flat Holm in the Bristol Channel and Skomer in West Wales, while full-grown birds have been cannon-netted and ringed near Manchester, Lancaster and Glasgow. Sightings of some of these have been made during the winter months; they show a very similar pattern to the Isle of May individuals so need not be repeated. Of these I have just one piece of evidence of passage through the County. A full-grown bird, ringed on a tip near Lancaster on 8 July 1992, was at Gloucester Landfill Site on 26 August 1994 and then near Agadir on 8 January 1995.

LESSER BLACK-BACKED GULLS MARKED IN THE NETHERLANDS

Up to 2,000 pulli are colour-ringed annually at port installations in and around Rotterdam and a smaller number of adults and pulli in coastal areas. This constitutes by far the largest colour-ringing scheme in Europe and hence it has provided the greatest number of sightings on visits to Portugal and Morocco. As previously I have compiled Figure 7 to illustrate sightings in the County and have divided them into two groups, immatures (up to three calendar years old) and adults. Because of the small samples the two years sightings are combined into one for each group. The adults in Figure 7 show the anticipated pattern of records, with none during the summer months, and then a sudden appearance at the end of August as they move from the nesting areas. Just one Dutch adult bird has regularly wintered at Gloucester Landfill Site, being seen on many occasions from 25 August 1994 to 20 February 1995, from 5 September 1995 to 27 March

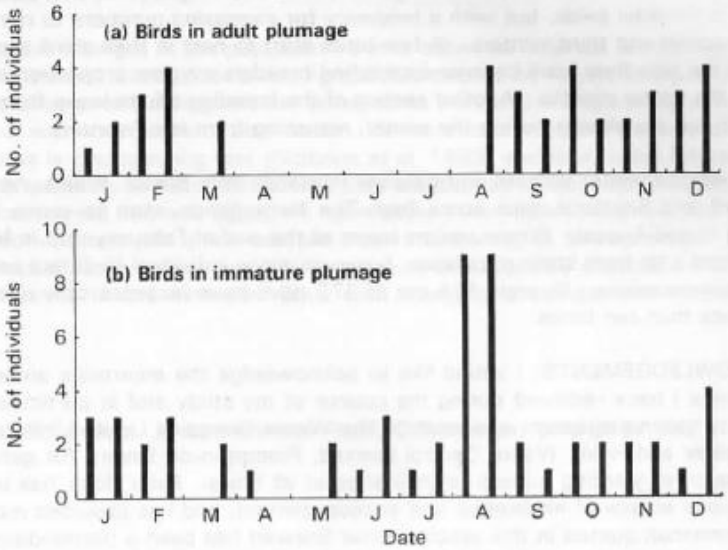

FIGURE 7. Timing of sightings in Gloucestershire of Dutch Lesser Black-backed Gulls

1996 and from 21 August 1996. The young birds in Table 10 show a scatter of records, demonstrating how they wander over a wide area throughout the year. There is a very definite peak in August. Some of these are juveniles, but more are first-summer birds, so presumably these return to their general nesting areas in The Netherlands during the summer months and then disperse before moving south to the Continent.

SUMMARY

The wintering population of the Lesser Black-backed Gull in Gloucestershire has increased greatly since the late 1940's, from about 10 in the winter of 1949-50 to a peak of about 20,000 in November 1989. The species has become established as a breeding bird at rooftop colonies in the County since the late 1960s. A study of colour-ringed birds has demonstrated that some juveniles move quickly away from the Gloucester colony in early August and that some from other parts of Britain and The Netherlands pass through the County at this time. Other juveniles move around the area in September, but by October most have migrated south, with large concentrations being seen in Portugal in this month. Very few individuals remain in the County during their first winter, but many return in their

first summer from late May until August. For Bristol ringed birds this pattern is repeated for older birds, but with a tendency for increasing numbers to remain in their second and third winters. A few birds start to nest in their third summers and by the time they have become established breeders a higher proportion remain during the winter months. Another section of the breeding adults leave from early August and are absent during the winter, returning from late February.

Colour-ringed winter visitors and passage migrants from Bristol, Wales, northern England and Scotland, plus some from The Netherlands, start to arrive in the County in mid-August. Winter visitors leave at the end of February and in March. They form a far from static population, however, since individual birds are seen on very few occasions. Overall, 115 out of 373 have been recorded only once and 80% less than ten times.

ACKNOWLEDGEMENTS: I would like to acknowledge the enormous amount of assistance I have received during the course of my study and in particular that given by the management and staff of The Waste Company Limited, Hempsted, Gloucester and Hales Waste Control Limited, Frampton-on-Severn for generous permission in granting access to their sites at all times. Peter Rock has been a continuous source of inspiration and encouragement, and has provided much of the information quoted in this article. Peter Stewart has been a tremendous help in the preparation of tables that have illustrated my sightings. Norman van Swelm and Arie Spaans of The Netherlands have given great assistance in identifying Dutch ringed birds and providing information of other birds ringed on the Continent. I thank too all the other colour-ringers who have patiently answered my queries and given details of their birds and members of the Severn Estuary Gull Group who have helped in many ways. Finally I would like to acknowledge my appreciation to Jeremy Blackburn and Jacquie Clark, and other members of staff in the Ringing Office at The British Trust for Ornithology, for processing all my sightings of colour-ringed gulls that have been sent to them.

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POSTSCIPT

Substantial changes in the population trends between colonies are taking place, with reductions, due to poor breeding success caused by food shortages at such sites as Skomer and culling in other areas, while increases are occurring at rooftop colonies, with extensions of distribution. Given that in northern Norway the race *L.f.fuscus* is disappearing fast (Gibbons *et al.* 1993) and that in the future great changes are likely to occur in the way that we dispose of our rubbish, with more being incinerated and less tipped on open sites, then I believe the species' future is far from certain and it will warrant closer monitoring by birdwatchers. Lesser Black-backed Gulls have proved themselves to be extremely adaptable and it will be interesting to see how they cope with changing circumstances in the years ahead.

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THE DIET OF OWLS IN GLOUCESTERSHIRE

Mervyn Greening

Owls typically eat their prey whole and regurgitate the indigestible parts such as fur, bones and feathers in the form of pellets. Usually two pellets are produced each day and in those species which use a regular roost site, at least one of these pellets is regurgitated at the roost site just prior to leaving the roost for the next feed. By collecting the pellets, a valuable insight can be gained into the diet of owls (and especially for those species that specialise in small mammals, of the species that occur in the locality). The technique has been extensively used in many parts of Britain, but in Gloucestershire only one such investigation has been reported (Swaine 1976). This came about as a result of an influx of Long-eared Owls *Asio otus* and, based on pellets collected by R.Lester and identified by R.Hancock at the birds main roost site, this showed the species to have been feeding mainly on rodents. This Long-eared Owl roost was used again in 1991 and further pellets were collected by K.N.A.Alexander and R.Lester. These, plus a large collection of Barn Owl *Tyto alba* pellets from a nest and roost site at Beverston and smaller numbers of pellets from a number of sites in the county have led to the production of this review of the diet of owls in Gloucestershire.

MATERIAL AND METHODS

The results reported here are based on a total of at least 520 pellets. Where possible the pellets were analysed individually, each one being measured and weighed dry, a description of appearance made, then soaked in water and teased apart. The Long-eared Owl pellets from Eastleach had been in carrier bags too long to be treated individually, so were analysed in batches by stirring up the pellets in water until fur and bone had separated. Identification was based mainly on skull and dental characteristics using standard identification guides such as Bang & Dahlstrom (1977), Brown *et al* (1987), Corbett (1989, 1991), Lawrence & Brown (1974), Svensson (1992) and Yalden & Morris (1990).

RESULTS

LONG-EARED OWL

A summary of the contents of Long-eared Owl pellets collected in Gloucestershire is given in Table 1, and of the measurements and weights of pellets in Table 2. Long-eared Owls eat more birds than other species of owls, and as the results show, Gloucestershire Long-eared Owls are no exception. The Pamington sample

TABLE 1. Diet of Long-eared Owls based on pellets collected in Gloucestershire [a]

Species	*Eastleach 1976*	*Eastleach 1991*	*Pamington*	*National* [b]
Microtus	24	43	65	47
Clethrionomys	0.3	18	0	11
Apodemus	40	32	21	18
Rattus	6	0.4	0	3
S.araneus	0.3	0.2	0	3
S.minutus	0	0.2	3	1
birds [c]	23	6	8	15
others	6.3	0.2	3	2
sample size	150	270	20	-

a Figures in this table are percentage numbers of prey items from each sample.
b National figures are from a very large sample taken from a variety of habitats around Britain (Glue 1974 and 1977).
c Includes the following: Yellowhammer, Starling, Meadow Pipit, Skylark, thrush sp., Robin, Chaffinch, Great Spotted Woodpecker, Bullfinch, Goldcrest, Blackbird, tit sp., bunting sp., Greenfinch and Goldfinch.

TABLE 2. Sizes of pellets produced by Barn and Long-eared Owls in Gloucestershire

		Barn Owl	*Long-eared Owl*
length (mm):	mean	44	34
	range	28-68	17-48
diameter (mm):	mean	28	18
	range	15-42	15-20
mass (g):	mean	4	1.8
	range	1.4-7.1	0.4-3.2
sample size		158	57

was small, and this may explain the deviations from the national figures. However the high percentage of *Microtus* in the pellets makes one wonder if the roost developed to exploit a local abundance of voles in that one year. Supporting this view is the fact that this roost has only been used twice, the previous time by Short-eared Owls *A.flammeus*.

The 1991 Eastleach sample was very large, so its variation from the national figures is probably best explained by local abundance of Wood Mice which figures prominently in their diet. The 6% by prey items of birds in the sample belies the importance of birds in the owls diet, as this analysis has been done by prey items. and a number of the birds caught by the owls were considerably larger than some of the mammal prey items. (In some analyses this discrepancy is avoided by allocating prey scores to different organisms according to an average weight for each, therefore voles would equal 1, shrews would equal 0.5 and birds would be allocated progressively higher scores the bigger they were.) Bird remains are notoriously difficult to identify from pellets, but those that were identified included: Yellowhammer, Starling, Meadow Pipit, Skylark, thrush sp., Robin and Chaffinch.

An interesting feature of the two Eastleach sets of data is the huge difference between vole figures. In itself this is not so surprising for *Microtus*, as this species undergoes large fluctuations in population numbers on a cyclic basis, so we can assume that 1976 was not a peak year for *Microtus* numbers. This explanation however is not applicable to the Bank Vole as its numbers are not known to fluctuate in this manner, so their absence from the 1976 sample is remarkable. (No data exists on habitat changes or otherwise that might throw light on this anomaly). The absence of the voles probably explains the high number of birds in the 1976 sample, taken to compensate lack of mammalian prey, a large number of which were Starlings (not surprising as the owls share the roost with an enormous number of Starlings).

BARN OWL

The sample of pellets from Beverston was large, so it is no surprise to find a great similarity in the diet of Gloucestershire Barn Owls and birds from the rest of Britain (Table 3). Barn Owls eat a lot more shrews than other owls, which is probably a reflection of their different feeding habitats. Barn Owls use rough pasture, field edges, hedges and wall edges for most of their hunting, as opposed to the open grassland used by Short-eared Owls and the woodland margins used by Long-eared Owls. The range of mammalian prey items taken by Barn Owls is greater than that of the other owls in the county, and includes all three mainland species of shrew, Mole, Yellow-necked Mouse and House Mouse.

TAWNY OWL

Tawny Owls do not use a regular place to regurgitate pellets, so their pellets tend

TABLE 3. Diet of Barn Owls based on pellets collected in Gloucestershire [a]

Species	*Beverston*	*National*
Microtus	36	46
Clethrionomys	2	4
Apodemus	12	12
Rattus	0	2
S.araneus	34	25
S.minutus	10	5
birds [b]	3	3
others	3	3
sample size	159	-

a Figures in this table are percentage numbers of prey items from each sample.
b Includes Meadow Pipit and Chaffinch.

to be few and far between. Of the few Gloucestershire ones analysed the Wood Mouse has been the major prey item. Other mammals have included a Pygmy Shrew, a rat, and two Field Voles and two Bank Voles.

LITTLE OWL

Little Owls *Athene noctua* produce two types of pellet, one brown in colour and very earthy, produced when feeding on earthworms, and a grey "furry" pellet produced when mammalian prey is taken. The sample of Little Owl pellets is too small to come to any conclusions, but the following animals have been found in little owl pellets: Bank Vole, Field Vole, Wood Mouse and Common Shrew. No bird remains have been found in any of the pellets, but large amounts of beetle remains have been. The Gloucestershire Naturalists' Society mammal records also indicate that Water Voles should be on the list of prey items for Little Owls, as a Little Owl was observed to take one near Frampton-on-Severn.

CONCLUSIONS

The results presented here show that owls in Gloucestershire mostly eat the same prey and in similar proportions to owls elsewhere in Britain. Voles are very important for all four species and even Long-eared Owls, which seem well able to exploit avian prey, take a large percentage. Nevertheless each species has its favoured range or variety of food items and can adapt to local surpluses or

shortfalls as needed. Pellet analysis not only provides valuable data on the diet of owls but also contributes to our knowledge of the distribution of mammals in the county. One particular feature of the present results here is the absence of any Harvest Mouse remains, even though the sample of pellets analysed was large and three batches of pellets came from areas where Harvest Mice might have been expected. Also no bat or frog remains were found, both of which occur in some samples from other parts of Britain, although this may simply be due to seasonal factors.

ACKNOWLEDGEMENTS: Thanks go to K.N.A.Alexander, R.Lester, R.M.Sellers, R. & S.Stevens and J.Hughes for collecting pellets.

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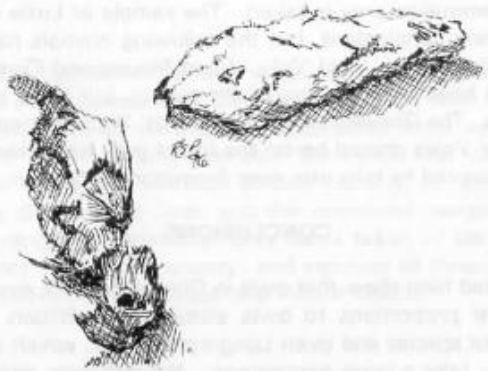

HERONRIES IN GLOUCESTERSHIRE 1992-1996 - A REVIEW OF THE BTO HERONRIES CENSUS

Robert A.J. Purveur

Davis (1991) comprehensively reviewed the status of heronries in Gloucestershire, covering the historical and current situation of heronries up to, and including, 1991. This paper is an update to Davis' report, covering changes in Gloucestershire heronries from 1992 to 1996. As with Davis, site names only are used, exact grid references are not given.

The breeding Grey Heron *Ardea cinerea* population of Gloucestershire has shown a steady increase in the period covered by this paper. The number of known active heronries in the county has remained at five, and the estimated number of occupied nests reported to the BTO Heronries Census throughout this period is at its highest levels since 1959.

The Grey Heron is widely distributed and well recorded in the county, albeit a rather uncommon resident. The known breeding population is thought to be about 30 pairs. Individuals and small groups are regularly seen throughout the year as they move between feeding and roosting grounds, and the species is recorded as part of the National Wildfowl Counts between October and March. Despite the attention it receives, it is possible that there are active heronries in the county other than those described below and the author would welcome records of any Grey Herons seen during the breeding season.

The BTO Heronries Census has monitored all known active heronries in the county on an annual basis, producing yearly estimates of the number of occupied nests at each site. This information is important as the Grey Heron is a species which is particularly susceptible to harsh weather in winter, especially so for first-winter birds. The relationship between survival and winter conditions for first-winter birds has been described in detail by North (1979), and Mead *et al.* (1979) have shown, using ringing recoveries, that mortality for first-year birds is two or three times greater than that for older birds. The Heronries Census information is also needed to provide a reliable estimate of the number of Grey Herons in a particular locality so that any potential licence applications to shoot them can be considered based upon relevant facts. However, control of Grey Herons is now considered unnecessary as most farms can now be fully protected from Grey Heron predation as documented by Carss & Marquiss (1992).

At the end of 1991, Davis reported that there were five active heronries in

Gloucestershire, with an estimated total of 23 occupied nests for that year.

The 1992 breeding season was preceded by a generally mild winter and saw an increase in the estimated total of occupied nests to 25. The Windrush Valley and Purton heronries both saw an increase in occupied nests to 8 from 6 and 4 respectively. The number of occupied nests at the Elmore and Whitminster heronries remained static at 3 and 2 respectively. The heronry at Rendcomb showed a decrease in occupied nests from 8 in 1991 to 4 in 1992.

Although there were some severe frosts and freezing fog at the beginning of 1993, these were short-lived and another relatively mild winter again helped the county's herons. The rise in the total occupied nests continued in the Windrush Valley increasing to 10 occupied nests and the relatively new Whitminster heronry increasing to 3 occupied nests. The remaining heronries at Elmore, Rendcomb and Purton remained at their 1992 levels. Davis believed that a pair of herons may have attempted breeding at the 'extinct' heronry at Frampton-on-Severn in 1993, although conclusive proof of the nesting attempt could not be obtained. The Frampton on Severn heronry is the oldest known heronry in the county, having been occupied until 1860, then deserted until 1899. The last known breeding record for it was of one nest in 1980.

The total number of occupied nests in 1994 continued at its 1993 level of 28 nests. Another mild winter in the county was reflected in increases in occupied nests at Elmore (5 nests), Purton (10 nests) and Whitminster (4 nests). Subsequent records submitted to the County Bird Recorded suggest that 5, possibly 6, nests were finally occupied at Whitminster although this was not recorded during Heronry Census fieldwork. The Windrush Valley heronry dropped to 6 occupied nests whilst no nesting activity was observed at Rendcomb. The latter witnessed some clearing of an adjoining plantation and it is thought that this disturbance, to which the Grey Heron is particularly susceptible, may have caused the nil return. However an adult and two juveniles were recorded in flight at nearby Edgworth so it is possible that the herons may have bred in a different location. More extensive observation of the heronry at Frampton-on-Severn was undertaken in 1994, resulting in the discovery of 2 occupied nests in a different part of the site and the return of the heronry to the 'active' list.

Once again mild weather dominated the 1994/95 winter. The heronries at Frampton-on-Severn and Whitminster both had the same number of occupied nests as they did in 1994 (2 and 4 respectively) whilst birds again failed to use the heronry at Rendcomb. Elmore showed another increase, 7 nests being occupied. No count was undertaken at the Windrush Valley heronry although the site was occupied. No Heronries Census return was received for Purton, but at least 8 nests appear to have been occupied, a slight drop on the 1994 total. With no nesting at Rendcomb and no count from Windrush Valley the 1995 total dropped slightly to an estimated 21 occupied nests. Assuming that the Windrush Valley heronry produced its average of 7 occupied nests then the 1995 total would have been 28, continuing at the high levels of the preceding three years.

Despite harsher weather conditions over the 1995/96 winter, Gloucestershire's breeding herons appeared to have fared well. The Windrush Valley heronry produced an estimated 8 occupied nests in 1996. The Elmore heronry showed a drop to 4 occupied nests and Purton showed a drop of 1 nest to 7 occupied nests. However, the heronries at Frampton-on-Severn and Whitminster both showed increases in occupied nests over 1995, from 2 to 3 and 4 to 7 respectively. Herons were observed showing an interest in the Rendcomb heronry although no nesting activity was attempted. Disturbance continues to be a significant factor on nesting at this heronry. The total of 29 occupied nests for 1996 represents the highest total recorded by the Heronries Census in Gloucestershire since 1959.

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BTO/RSPB NIGHTJAR SURVEY 1992 - GLOUCESTERSHIRE RESULTS

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Nationally the Nightjar *Caprimulgus europaeus* has been in long-term decline since at least 1930, declining more steeply since the 1950s. There may be many reasons for this decline including fragmentation of heathland and downland Nightjar habitat through scrub invasion, forestry planting and reclamation for agriculture. It has also been suggested that climatic changes are implicated. Spring arrivals have averaged later since the 1920s and an East Anglian study has shown that proportionately fewer second broods were being reared compared to the figures for the same region 50 years previously.

Breeding Atlas fieldwork 1968-1972 recorded Nightjars in 656 10 km squares in Britain and Ireland and the population then was thought to be around 3,000 pairs (Sharrock 1976). A previous BTO study in 1981 found Nightjars at 764 sites in 241 10 km squares. The population then was thought not to exceed 2,100 pairs (Gribble 1983). This unexpectedly large reduction in numbers was accompanied by an obvious range contraction in Scotland and northern England as well as Ireland and Wales.

The 1992 survey had two main objectives: firstly, to count and map the location of all breeding Nightjars in lowland Britain, and secondly, to describe the habitats at Nightjar breeding sites. A third objective will be to review the available data on Nightjars in upland forests and to design an appropriate survey if the number of birds involved potentially merit further work.

In total, ten sites were covered in Gloucestershire, all of which were in the Forest of Dean. These sites were selected for coverage on the basis that they have held Nightjars in recent years or because they had potentially suitable habitat for Nightjars.

Survey work involved making a minimum of two visits to each site between the last week of May and mid-July to record 'churring' males, with at least one visit during June when Nightjars are most vocal. All visits to Gloucestershire sites were made at dusk, avoiding adverse weather conditions which depress Nightjar activity (wind speed exceeding force 4 or rain).

For each visit the location of churring males was recorded on Forestry Commission stock maps, and at the end of fieldwork the number of males was determined for each visit and the total number of males for the site estimated. The habitats in which churring males were located was also recorded.

TABLE 1. Estimated number of males for each Gloucestershire site

Survey site	*Estimated No. Males*
East Wood, Tidenham	2
Oakenhill	1
Mallards Pike	1
Beechenhurst	0
Serridge Enclosure	1
Spruce Drive	1
Woorgreens	3
Birchwood	2
Howbeech	0
Ruardean	1

The estimated number of males is the number of individual males present at each site in the opinion of the observer. This figure is based on the mapping techniques used to record males on each visit. Caution was exercised in distinguishing between individuals on each visit - only simultaneously churring males could be regarded as more than one bird with certainty. For the purposes of the survey, records of Nightjars which were less than 400 m apart on different visits were treated as being the same male. Hence, the estimated number of males for each site should be treated as a conservative estimate and may be lower than the actual number of males present.

The Gloucestershire results were encouraging (see Table 1). Over the past 12 years the maximum count of males in the Forest of Dean was just 15 in 1980 (Ridler pers. comm.). This survey has estimated that there were 12 males spread over eight sites in 1992. Weather conditions in 1992 helped the Nightjar, with favourable tailwinds and warmth hastening their safe return. 1992 had the warmest May for 160 years and the warmest June since 1976 - factors which contributed to early nesting and egg-laying by the Nightjar.

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BTO SAMPLE CENSUS OF ROOKERIES, 1996 - GLOUCESTERSHIRE RESULTS

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Rooks *Corvus frugilegus* are well known to everyone as farmland birds, roadside scavengers, and less frequently as urban or garden visitors. They nest noisily in the familiar treetop colonies that are conspicuous also in winter, when the birds are usually absent but when the old nests become more visible among the leafless branches. These nesting habits make the Rook one of the simplest of our breeding birds to census. While annual monitoring of rookeries has not been feasible, there have been periodic surveys by the BTO and other organisations that have told us a great deal about their population changes this century.

The BTO carried out a full survey of Rooks in 1975, followed by a sample survey of rookeries in 1980 based on 10 km squares. Pierce (1980) summarised the Gloucestershire results, suggesting that the tendency towards more small rookeries identified in 1975 had been reversed overall, with an increase of 3%. There is little information, however, to indicate how numbers have changed nationally over the last 20 years - a period that has seen both tremendous upheaval in farmland management and severe decreases in many birds characteristic of the farming landscape.

To fill this gap, the BTO, supported by the Department of the Environment, organised a nationwide sample census of rookeries in spring 1996. The results will be used to compare the UK breeding population of Rooks now with the figures from the last complete census in 1975. The 1996 counts will also form a firm baseline for future surveys. Rather than attempt to count all Rook nests, as was done in 1975, the BTO opted to survey sample areas of the UK. The selected sample will tell us clearly how numbers have changed, without the enormous effort needed for a full survey.

A sample of 2,000 tetrads (2 x 2 km squares of the national grid) across the UK was selected. For each tetrad, a count of the number of nests in each rookery was made just before leaf-burst in mid- or late April. This is the time of year when the number of nests best represents the real number of breeding pairs. For census purposes, the BTO defined a rookery as any active Rook nest or group of nests separated by 100 m or more from the next nearest nest or group.

20 tetrads were selected for coverage in Gloucestershire, with fieldwork being achieved for 19 of them. A grand total of 504 nests were found, spread among

TABLE 1. Results from tetrads recording Rookeries in 1996 [a,b]

Tetrad	*Ref Name*	*Ash*	*Beech*	*Elm*	*Oak*	*Syc*	*dec*	*S.Pine*	*conif*	*unid't*	*Total*
SO50R	Highgrove Fm	11									11
	Highgrove Fm	8									8
	Coldharbour	53									53
SO71Z	Highnam Ch		1				1	8			10
	Highnam Ct	1			7	4	5	2			19
SO82A	Lassington Ct	20									20
	Persh Farm							40			40
	Persh Farm									4	4
SO82U	Deerhurst				16						16
	Apperley				11						11
SP01J	Shipton Oliffe						4		1		5
	Shipton Oliffe		15				10				25
	Shipton Oliffe						17				17
	Shipton Oliffe				1						1
SP02D	Langley Brook			10							10
SP03Y	Buckland				43						43
SP10B	Bull Lane Fm	23									23
	Poulton Gr		23						2		25
	Hartwell Farm						28				28
SP11C	Leygor Manor	15					7		6		28
	Millend	25			5		7				37
SP13X	Batsford Park		3								3
	Dorn Hill					25					25
	Dorn Hill	3			1						4
ST89X			11								11
						5	22				27
	Total	159	53	10	84	34	101	50	9	4	504

a Tetrads in which no Rookeries were located: SO61Q, SO72V, SO90L, SO90Q, SO90R, SO91K, SO92R, SP11Y.

b *Syc*, Sycamore; *dec*, other deciduous; *S.Pine*, Scots Pine; *conif*, other coniferous; *unid't*, unidentified.

TABLE 2. Trees used by Rooks for nesting in Gloucestershire in 1996

Tree type	*No. Nests*
Ash	159
Beech	53
Elm	10
Oak	84
Sycamore	34
Other deciduous trees	101
Scots Pine	50
Other coniferous trees	9
Non-tree/unidentified	4

26 rookeries as shown in Table 1. Where a rookery overlapped a tetrad border, fieldworkers were asked to estimate the number of nests which lay outside the tetrad - this accounted for 68 of the 504 nests in Gloucestershire. Fieldworkers were also asked to provide a breakdown of each rookery total by tree type. This revealed a wide range of tree species being used by Rooks. The 504 Gloucestershire nests were made up as shown in Table 2.

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