RAS *News*

RAS News *is the British Trust for Ornithology's newsletter for its Retrapping Adults for Survival (RAS) scheme. Additional copies are available on request or can be downloaded in pdf format from the BTO website www.bto.org.*

Number 8 May 2006

Progress on evaluating RAS projects

Through the RAS scheme, the BTO's licensed ringers are encouraged to focus their efforts on collecting data that can be used to monitor the survival rates of breeding birds. In a series of independent RAS projects, ringers concentrate on a particular species within a defined area, and attempt each breeding season to record every breeding adult as an individual – by ringing it or by noting a ring or colour rings placed earlier. The turnover of breeding adults between seasons measures survival rates, site by site, in a way that is not possible through general ringing.

The most valuable RAS projects are for species that are poorly covered by the Constant Effort Sites (CES) scheme and are of UK conservation concern. Ideally, there would be at least five projects per species, to monitor survival over a representative part of the species' range.

The formal start of RAS was not until 1998, but many of the projects registered since then have provided data for earlier years – in one case beginning in 1968!

RAS sets ringers the challenge of collecting enough data to monitor adult survival rates over a period of at least five years. This is a tough assignment, however, especially as the number of returning birds becomes apparent only once the project is already operating.

Evaluating success

Even the busiest project can fail if few returning adults show up in the data. The success of a project cannot be fully realised until a calculation of survival rates is actually undertaken – but resources for this are limited. Rob Robinson and Stuart Newson have recently run survival analyses from a number of long-running projects. Their results are discussed on pages 4–5.

Photo: George H Higginbotham

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RAS in 2005

The RAS scheme continued to advance strongly in 2005. A good number of projects have submitted data for 2005 (95 projects for 36 species), although these are smaller numbers than last year's equivalents for 2004 (114 projects for 44 species). The species breakdown of data sets received for 2005 was as follows. The current figures for 2004 (total 121 projects on 44 species, including data sets submitted after last year's newsletter copy date) are given in brackets for comparison.

None of these figures is final, as several more data sets are expected at BTO HQ, and there are still ongoing projects relevant to RAS that have not yet registered, but may eventually do so. Non-appearance of a project on this list is no guarantee that it has ceased to operate.

Eider	4	(5)	Whinchat	-	(1)
Manx Shearwater	1	(1)	Wheatear	2	(2)
Storm Petrel	3	(3)	Blackbird	1	(1)
Shag	1	(1)	**Song Thrush**	1	(1)
Little Ringed Plover	1	(1)	Sedge Warbler	4	(4)
Ringed Plover	1	(1)	Reed Warbler	5	(5)
Dunlin	2	(2)	Whitethroat	2	(4)
Common Sandpiper	2	(2)	*Wood Warbler*	1	(1)
Kittiwake	1	(2)	*Willow Warbler*	1	(1)
Guillemot	1	(1)	*Goldcrest*	-	(1)
Razorbill	1	(1)	Pied Flycatcher	15	(19)
Barn Owl	1	(1)	*Bearded Tit*	1	(1)
Tawny Owl	1	(1)	**Marsh Tit**	1	(1)
Swift	1	(2)	Coal Tit	-	(1)
Sand Martin	15	(17)	Blue Tit	-	(1)
Swallow	6	(7)	Great Tit	1	(2)
House Martin	3	(4)	**Starling**	-	(1)
Tree Pipit	1	(1)	**House Sparrow**	4	(7)
Dipper	2	(3)	Chaffinch	3	(3)
Dunnock	-	(1)	Siskin	3	(3)
Robin	1	(1)	**Yellowhammer**	-	(1)
Stonechat	1	(1)	**Reed Bunting**	-	(1)

The six species whose names are in bold type are **Red-listed** on the UK list of birds of conservation concern, and the 20 in italics are *Amber-listed*. The remaining 18 species are Green-listed.

There are ten other species for which RAS data sets have been submitted, but not for 2004 or 2005, as follows (with number of projects in brackets if more than one): *Red-throated Diver*, *Arctic Tern*, **Nightjar (2)**, **Woodlark**, **Grasshopper Warbler**, **Tree Sparrow (3)**, Greenfinch, Goldfinch, **Linnet (5)**, and **Bullfinch**. These species, along with some of those tabulated above but without a 2005 contribution so far, may be species for which the RAS method is proving unsuccessful. This could be for example because birds are too hard to catch or resight in sufficient numbers, because the population is too mobile from year to year, or because too few returning adults were being recorded. Sadly, given that the greatest need for data is for species of conservation concern, there is a strong preponderance of Red-listed and Amber-listed species in this category. We would still encourage further RAS projects on these species, however.

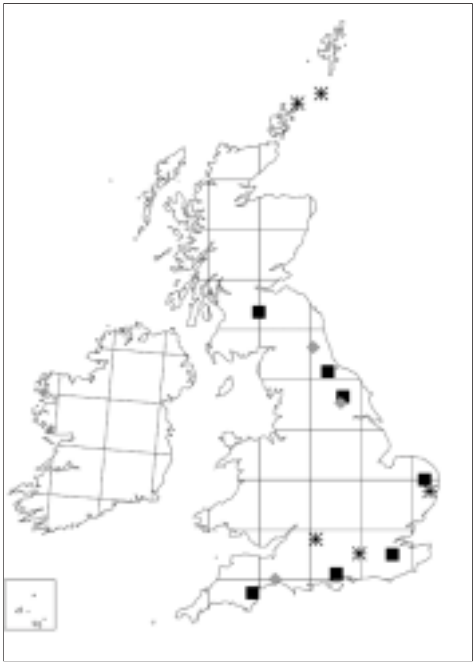
The five-year review of RAS in 2003 drew attention to the need for multiple projects for each species across the country. As RAS develops, it is likely that the species list will shrink to a set of core species, for which multiple high-quality RAS projects can be maintained. A list of species which we are keen to encourageRAS projects on was published in *RAS News* 5 (p9). Can we extend the list of species like Sand Martin, Swallow, Pied Flycatcher and House Sparrow, for which the number of active projects is already above five.

Major progress was also made in 2005 in adding new capture files and summary data for past years to the RAS database. A new Pied Flycatcher project arrived complete with data back to 1972. Many ringers responded positively to our requests for information that was found to be lacking from our records – and we are very grateful to them for this.

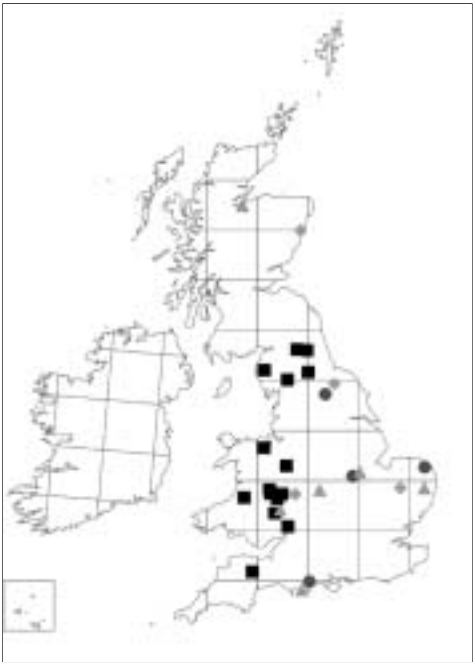
New for 2006

It is not possible to be definitive about new projects that may be submitted to RAS in 2006, since we know there are a number of unregistered projects on the go that may eventually come our way. We have been told, however, of a further three new House Sparrow projects (see Map 1), and of others for Crossbill, Siskin, Stonechat and Dartford Warbler, that will be active this year.

If any readers are operating RAS-style projects that are not yet registered with the scheme, please consider whether they can now formally join the RAS programme.



Map 1. The three new House Sparrow projects are shown (diamonds). Seven other HOUSP projects projects have already provided 1–3 years' data (squares) and five more have ceased to operate (asterisks).



Map 2. These long-running RAS projects contributed to the analyses reported on pages 4–5: triangles, Sand Martin; diamonds, Swallow; circles, House Martin; squares, Pied Flycatcher.

RAS comes of age

For several summers now, many of you have been assiduously catching adult birds to gather data on annual survival rates. The procedures for estimating annual rates of survival are quite data hungry – that is, they require information about a lot of birds, over a number of years. Now, thanks to all your hard work, we are in a position to produce estimates of annual survival rates for several species.

To work out survival rates, we actually need to estimate two quantities – the survival rates themselves, which are assumed to change between years, and the recapture rate (the chance that a bird that is alive will actually be recaptured or resighted during the RAS season - see p10). This recapture rate will depend on a number of factors, such as the habitat, and the effort invested in trapping (or resighting) each year. The greater the recapture rate, the more accurate and precise the survival estimates will be.

A chance to run some more survival analyses, for a small range of species, arose earlier this year. We took this opportunity to look again at Pied Flycatcher survival rates, first analysed in 2002 (see *RAS News* 4). The data we used back then could now be updated with the subsequent years from those projects and with data from several long-running projects new to RAS since that date. This represented a real challenge for our computers, since there are now so many studies in operation – more than 15 with a good run of years. Some of these projects have been very long-running – remarkably, David Boddington has submitted data going back to 1968, when the formal start of RAS was still 30 years ahead (see pp 6–8).

Long-term results for Pied Flycatchers

The average survival rate over all sites is shown in Figure 1. There does not seem to have been much overall change in the survival rate, which has remained at around 35–40%, roughly what we would expect from other studies (notably in Scandinavia). Most of the individual sites are more or less correlated with this overall trend, though the pattern of survival on three of the sites seems to differ. Perhaps surprisingly, there doesn't seem to be much similarity in annual survival rates between sites that are geographically close, though the sites in the northeast do seem to show a similar pattern. This suggests that other factors, such as habitat, may often be more important than region. There is clearly much scope for further work!

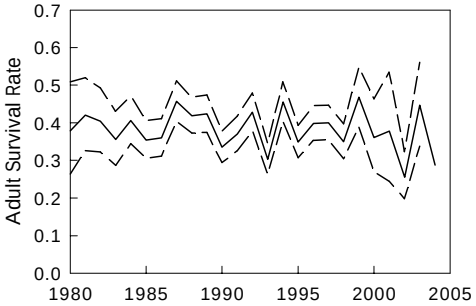


Figure 1. Average annual survival rates of Pied Flycatchers in Britain, 1980–2003.

Survival among hirundines

In addition to Pied Flycatchers we also looked at survival in the three hirundine species (Figure 2). Sand Martin is the second most-studied RAS species. Although we have fewer long-established projects for Swallow and House Martin, and each tends to catch fewer birds, we can still calculate survival rate estimates for these species reasonably well. Average survival rates over the whole period are similar to those in Pied Flycatcher, probably because all four are trans-Saharan migrants, though survival of House Martins (averaging 28%) does seem to be lower. This might be a real difference, or simply that House Martins are less site-faithful than the other species. (This is because the methods cannot distinguish between deaths and permanent emigrations from a site – in neither case will a bird be recaptured.)

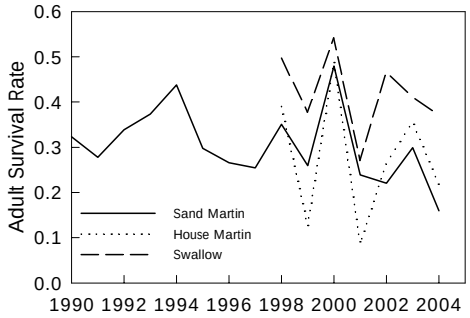


Figure 2. Average annual survival rates of three hirundine species in Britain.

Only for Sand Martin do we have enough historical data to calculate reliable estimates of survival before 1998. Since then, however, the patterns of survival rate between years for all three species have been remarkably similar. This is perhaps surprising, given that they winter in different areas, but on the other hand they do share a generally very similar ecology. Initial results suggest that these changes in survival are not related to rainfall in the Sahel region, as has been reported for example for UK Sedge Warblers, Hungarian Sand Martins, and Dutch Purple Herons. Interestingly, the annual changes in survival rates of hirundines and Pied Flycatcher do not seem to follow a similar pattern, which also suggests that mortality on migration may be relatively less important.

So – what makes a good RAS?

These results are clearly fascinating but, importantly, they also help to tell us what makes a successful RAS project. As we explained in *RAS News* 5, the number of birds retrapped (or resighted) each year is crucial to ensuring there are enough data to calculate accurate estimates of survival: these provide definite information that a bird survived over a given period. As Figure 3 shows, studies averaging fewer than 25 recaptures of adult birds per year tend not to provide such good estimates of survival rate, particularly when considered alone.

More precisely, studies that retrap fewer than 10 individual adults in consecutive years, *ie* 10 of the adults from each RAS season being recorded again the next year, tend not to provide good estimates, even when combined with other sites, and will probably not be used in our analyses. So, this should provide the target for RAS projects to aim at. If you are likely to fall short of this target in most years, it would be worth thinking of ways to increase the number of returning adults recorded, perhaps by using colour-marks, or even by increasing the size of the site if possible – perhaps enlisting extra help from other ringers or colour-ring observers.

Rob Robinson & Stuart Newson

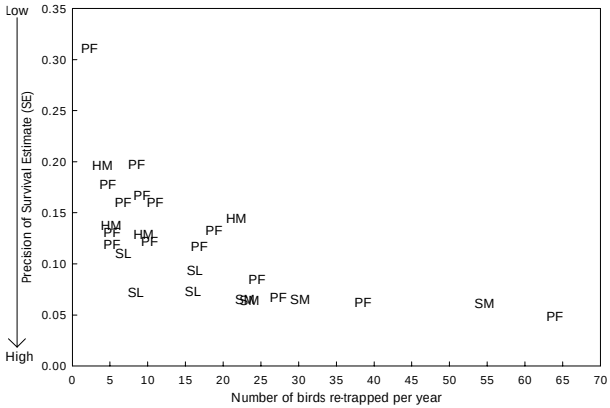


Figure 3. Precision of annual survival rate estimates increases with an increased number of birds retrapped per year. SL = Swallow RAS project, SM = Sand Martin, HM = House Martin and PF = Pied Flycatcher. Locations of projects are mapped on page 3.

Pied Flycatchers in Herefordshire

We commissioned this article in recognition that David Boddington's RAS project 125, for which data for 1968–2005 are on file, is the longest-running RAS project registered to date. Eds.

The Herefordshire Nature Trust was formed as the Hereford and Radnor Nature Trust in 1962 and immediately launched a nest box scheme. Dr Charles Walker, a prominent founder member, was keen that the scheme should begin strongly and start to show results within the first twelve months. Thus began a long history of large-scale nestbox ringing and recording in the county.

Pied Flycatcher was always the emblem of the project. This species was common in Wales, and occurred north and south of Herefordshire but with a hiatus between the Forest of Dean and the Wyre Forest, both in neighbouring counties. Early last century, birds were holding territory only in northwest Herefordshire, but soon after 1940 more southerly breeding birds were found at Moccas Park NNR. The distribution subsequently spread eastward, as nest boxes were erected, and by the early 1970s the species had reached the east of the county, only very rarely using natural holes.

Woods chosen for siting Pied Flycatcher nest boxes needed to be alder or oak. In Herefordshire, fine oak woods are usually on hills where steep stony and high land unsuited to farming was set aside for coppice and timber. A scatter of smaller sites was also maintained, despite their low Pied Flycatcher density.

The original aims of the scheme were to record yearly occupancy and breeding details, possibly with NRCs, and ring pulli and adults. These limited ambitions were quickly achieved, and soon there were accounts of ringed birds breeding in successive years, moving from site to site, and getting recovered in Africa, to enthuse Trust members. More recently, there has been a change in emphasis towards recording more detailed information from the boxes.

This account concerns three sites, all run with the initial aims of the Trust in mind but where additional biological data has been recorded for many years (including a study on invertebrates), with visits every 5–8 days from mid April until the end of the season. Constancy has been the watchword; and it has applied to the number, positions, and types of boxes. Even a succession of bleak years has been tolerated. The sites are each different in character, but avoiding variation in local habitat has made changes in box usage and outcome more meaningful.

The sites, main ringers, and number of boxes aimed for are Moccas Park (Alan Marchant, 70), Mary Knoll (Peter Gardner, 100), and Shobdon Hill Wood (David Boddington, 40). Chris Mead operated the Mary Knoll site during 1969–86. Each ringer attempts to lift or catch every breeding adult, but there are no attempts to net late-arriving non-breeders. Capture-resistant adults take up time that could more profitably be spent at other, small and distant sites. Yet not to service these other sites could mean failing to relocate our own ringed birds that have moved. Here is the dilemma, therefore: should we be prepared to miss out on ringing some broods in order to strengthen our knowledge of adult survival? Would it mean a less complete picture of nestling to fledging, and incomplete NRCs?

Percentage occupancy of nestboxes by Pied Flycatchers at these three sites (Figure 1) gives perhaps the longest available time-series in the UK for this species, which did not begin to have national population monitoring until the BBS began in 1994. To a large extent, these trends should reflect population change in Herefordshire. It should be noted, however, that at each site the number of boxes shows small (independent) variations and was well below target in the initial years.

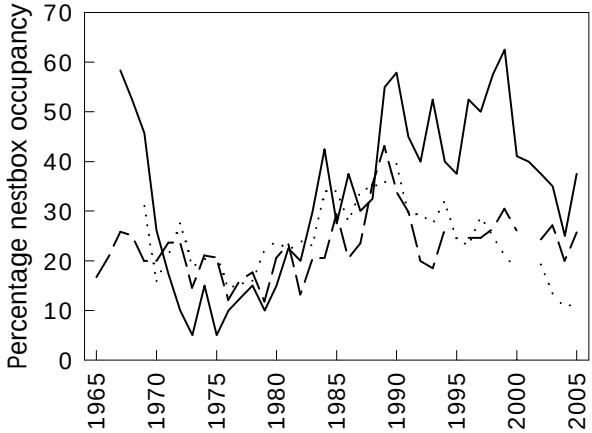


Figure 1. Percentage nestbox occupancy by Pied Flycatchers at three sites in Herefordshire: solid line, Mary Knoll; broken line, Moccas Park; dotted line, Shobdon Hill.

A late-season adult male, starting to go brown, perched on (not held by) the ringer: B869980, Shobdon Hill Wood, June 2001. *Photo: D G Boddington*

Occupancy was initally high at each site, especially Shobdon Hill, as the first boxes were erected and the birds flooded in. A drop in the proportion used was inevitable once the woods were full of boxes, but shallow declines continued well into the 1970s. Were Pied Flycatchers in fact in population decline then, perhaps responding to West African droughts alongside such species as Whitethroat and Redstart?

From the late 1970s to about 1990, each of the three sites shows a steady climb in occupancy rates, followed by a shallower decline. At all the sites, 2004 was poor by recent standards, and 2005 better. Variation around these trends is greatest for Shobdon Hill Wood, with a target of 40 boxes, and least for Mary Knoll where the target has been 100 – so is apparently an effect of sample size. Trends are least evident at Moccas Park.

A decline in Pied Flycatcher numbers since 1990 is also evident in RAS studies in Gloucestershire, Shropshire, Durham and Strathclyde (see *RAS News* 3), and fits with the significant decline of 35% logged by BBS during 1994–2004 (see www.bto.org/birdtrends). The implication from our data is that the national population decline may have begun around 1990, and that it follows increase throughout the 1980s. A possible link to West African rainfall should perhaps be investigated.

RAS captures

Catching adults has always been a part of the programme at each site, so that there is a close fit to the data requirements for RAS. Shobdon Hill (RAS 125) has a run of data extending back to 1968 already lodged with RAS, and for Moccas Park (RAS 184) the period begins in 1972. Mary Knoll has not yet been registered with RAS, but has by far the greatest number of adult captures and is probably the best-studied UK site for this species.

Total adult captures across years at each site are shown in the histogram (Figure 2). At Mary Knoll, 1.5 females have been captured for every male, while at Shobdon Hill and Moccas Park the figures are 4.2 and 3.6. These differing capture probabilities need to be taken account of in any survival analysis. Rates of recapture and control are high at 54%, 37% and 43% respectively, and at each site are a little higher for females than for males.

We look forward to seeing the results of survival analysis from our data in due course. Are there are consistent trends between sites? If so, will this help to explain the population fluctuations of the species?

David Boddington

The data David is discussing here also feature strongly in the analyses reported on pages 4–5. Eds.

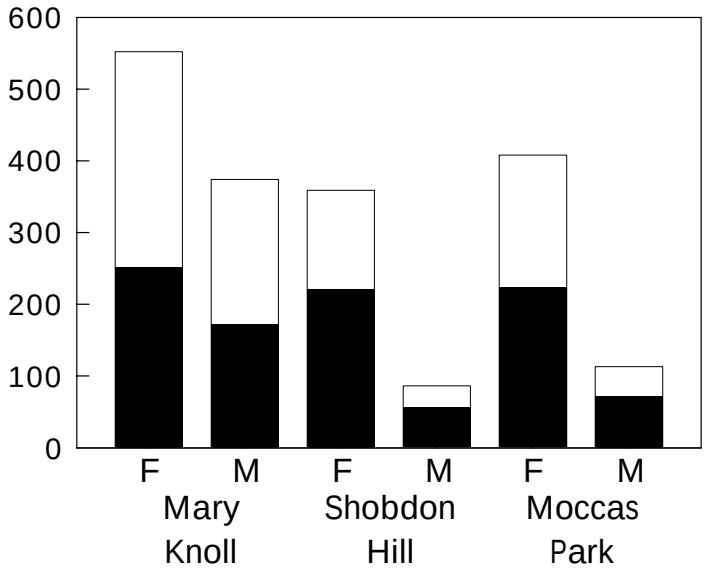


Figure 2. Total numbers of captures of adult Pied Flycatchers at three sites in Herefordshire. Figures given are the sums of the annual totals of individuals caught, either as new birds (filled bars) or as retraps or controls (hatched bars). Females and males are shown separately.

RASQs

There have been a number of "RASQs" (recently asked sensible questions) that we feel can usefully be dealt with here in the newsletter, for the benefit of all RAS ringers. Eds.

All my captures are there, but IPMR doesn't necessarily pick up all the records I need to submit in my RAS data file: why is this?

Records are selected for export to RAS submission files and totals according to the species, places, and season start and end dates you have set in your RAS window (IPMR/ Captures/Retrapping Adults for Survival). This sounds completely watertight, but a number of ringers have noticed problems, with not every bird that fits these criteria being picked up.

The answer to this problem seems always to lie with ringing subsites. If your ringing 'place' has subsites, the RAS window invites you to add relevant subsites to the list for which records will be selected. Even if you add all subsites to the list, a capture recorded with a blank in the subsite field will not be treated as a RAS capture. Thus, if your 'place' has subsites, and you have selected some or all of them in your RAS window, you must ensure that every capture relevant to RAS has one of the required subsite codes – a blank will not do!

I know the exact hatching years of most of my adult retraps, having ringed them as pulli or first-years. Should I use age codes 8, 10, 12 etc, rather than 4 and 6?

No. Please let your capture histories of these birds tell the story.

Do I still need to fill in the blue summary sheet? Doesn't IPMR provide all the necessary details?

We do still need you to complete a summary sheet for every year of your project. If submitted by the end of February in the following year, this entitles you to a RAS refund towards your ringing expenses. The information from the summary sheets is input to the RAS database, enabling us quickly to assess the progress of the scheme. At the level of the species, the database tells us how many projects have been operating each year, and what the prospects are for a broad-scale analysis. The numbers of individual adults recorded, and the number of those that were already bearing rings, give some indication of the number of adult returnees – but we haven't yet devised a simple method of assessing more precisely whether a project has provided enough data for a survival analysis.

The RAS window in IPMR (v 2.1.75) gives two summary options, but neither provides all the data requested on the blue summary sheet:

'**Summary details**' provides the total number of individual adults, the number of juveniles ringed, and the number of newly ringed adults (for RAS refund). Please copy these figures to your summary sheet. We do not need you to print out this report, but, if you do, remember to write on the year (which doesn't otherwise appear).

'**Annual summary report**' gives a breakdown of captures for your RAS species by year, age class and new/retrap, but without reference to the dates you have set as the breeding season. These figures are not directly relevant therefore to your RAS project, unless all your records fall within your RAS season.

The summary sheet can be downloaded from the ringers' pages on the BTO web site at www.bto.org/ringing/ringinfo/ras/ index.htm, if you do not have a hard copy to hand.

We are always happy to help with RAS queries: please phone or email ras@bto.org. *Eds.*

Using RAS data for survival analyses – some insights

Projects with missing years

Often, a RAS project may be unsuccessful in a particular year, for example through temporary lack of access, manning problems, or a shift of a Sand Martin colony. The most conspicuous instance is the FMD outbreak in 2001, when at least 20 RAS projects were badly disrupted.

Where a season is missed, or has very few captures, it will clearly not be possible to estimate an annual adult survival rate between the previous good year and the missing year, nor between the missing year and the following year. In theory, it should be possible to bridge the gap, and calculate an average survival estimate that covers a two-year period. For this to work, however, sample sizes would have to be large enough to provide enough retraps to work with, despite not one but two years' worth (compounded) of mortality among the ringed population. Among small birds, of course, annual mortality can be very high, and few individuals would be captured two or more years after ringing.

Longer-term monitoring of survival rates should be little affected by any missing years in the middle of the run, because parameters such as site-specific recapture probability could be assumed to be similar before and after.

Birds that skip a year

RAS ringers commonly observe that some individual adults may 'skip a year, or two', being recorded, say, in years 1, 4 and 5 of a study but not in 2 and 3. Some have been tempted to include such birds in annual RAS totals, on the grounds that they must have been alive, and were only missed by chance.

Such birds contribute to survival analyses in two ways. First, their recaptures are positive evidence of survival and put real data into the survival matrix within the analysis program. Second, their failure to be recorded, even though alive, in the missing years helps to estimate 'recapture probability', which in turn refines the survival estimates for all the years.

It is important, therefore, that RAS submissions relate directly to the year in question, and do not include any other birds known to be alive.

A special case concerns birds ringed as juveniles that are not recorded in the following year, but turn up subsequently as breeders in the study area. It is difficult to include the first two captures of such birds in an analysis of adult survival, because the rate at which such birds are recorded compounds the adult return rates (which we are trying to measure) with a first-year return rate (likely to be substantially lower). Opinion here is that inclusion of such birds would reduce rather than improve the precision of estimating adult survival. It may be possible to ignore the first year, but then use data for any further years that elapse while the bird is adult but before its first capture in this age-class – but RAS does not routinely collect any capture data for juveniles at present, and would have to do so retrospectively for individuals of interest.

Bolt-on studies

RAS ringers are an easily identifiable group of 'experts' on particular species, and may therefore be approached for help with other studies on their target bird. There have been recent instances, however, where participation in such additional work, either volunteered by the ringer or requested from BTO HQ, may have influenced return rates of the RAS study species, and so undermined the value of the RAS project for monitoring annual survival. Please talk to the Ringing Unit before taking on additional studies alongside your RAS project if you see any possibility that this might compromise the estimation of annual survival rates.

Request: winter-to-summer movements of resident birds

Gavin's request (below) is fully endorsed by RAS - please contact him if you can help. Eds.

I work in farmland bird research at the BTO, where I am currently working on a Defra-funded project investigating the potential benefits of supplementary feeding in winter for seed-eating (and other) birds. One key measure of these benefits is whether breeding populations respond to feeding in winter, but whether we can detect any increase in numbers will depend on where birds that are fed in winter go to breed as well as on how large the increase is. We know surprisingly little about the winter-to-summer (or vice versa) movements of "resident" birds. We also know little about the proportions of the breeding populations of partial migrants that winter locally, or the proportions of the wintering populations of species that are swollen by immigration from Scandinavia that are actually local breeders.

Part of our current work is concerned with trying to measure these movements using colour-ring resighting, measuring distances moved directly and also comparing local population sizes and proportions ringed in particular areas between winter and summer. Our species range is limited, however (mainly just Yellowhammer and Chaffinch), and we are also only covering sites in East Anglia. It then occurred to us that some RAS ringers might collect the sort of information we need almost as a by-product of their regular ringing activities. We hope you might have the right kind of data and be willing to share it with us.

Basically, we need four pieces of information for any area (such as your RAS study site), in addition to the size and location of the site: winter population size, summer population size, number (or proportion of the total present) carrying rings in winter and number (or proportion) carrying rings in summer. Standard RAS returns should provide the last of these. If you do a rough census of the local breeding population then your summer RAS returns will provide the other key piece of information for the breeding season. If you ring in winter in order to resight in summer or happen to ring in winter at the same site, you then know the number of birds present that are ringed (newly ringed or retrapped); this information can be extracted from your ringing data submissions. This leaves just an estimate of the numbers present in the area in winter as an "extra" piece of information, which you may or may not record already.

If you have all these data somewhere already, or would be willing to do a couple of extra, rough bird surveys through the winter, and you would be willing to share it all with us, that would be fantastic and I would be very keen to hear from you. We are interested in "resident" birds. If the whole local population leaves your study area, even if they only go a few tens of kilometres, they are "migrants" from our perspective and not useful for this analysis (although, if you have "resident" birds that do this, we would be very interested to hear about them!). We also need to be reasonably sure that the birds ringed in their "wintering area" are not actually on passage.

If you think you might be able to help with this piece of work or have any questions about it, please feel free to contact me at The Nunnery, or by email at gavin.siriwardena@bto.org. It would be great if you could help us out with this – for me, it represents one of a number of possible extensions to RAS projects that provide significant "added value" to help us make the most of all the hard work that ringers put in….

Gavin Siriwardena

RAS News

The British Trust for Ornithology's newsletter for its Retrapping Adults for Survival (RAS) scheme

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RAS contacts

If you would like to get in contact with other ringers working on particular RAS species, the following RAS ringers have offered their services as the first point of contact for their own subjects of study. Please use their contact details, as below. For other species and all other enquiries, please contact BTO HQ.

Common Sandpiper, Dipper
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