SCOTTISH RAPTOR MONITORING SCHEME

REPORT 2007

Brian Etheridge,
Mark Holling, Helen Riley, Chris Wernham & Des Thompson

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1 Foreword

In the autumn of 2009 I was very pleased to see the award of the Institute of Ecology and Environmental Management's (IEEM) 'Best Practice Award' go to the Scottish Raptor Monitoring Scheme. This does rich justice to the hard and professional work by the members of the Scheme, not least those in the Scottish Raptor Study Groups who work so hard to assemble vital information on the numbers, distribution and productivity of Scotland's raptors. Well done on this worthy achievement. The international Raptor Research Foundation conference at Pitlochry was a special highlight, at which we launched the second edition of *Raptors: a field guide for surveys and monitoring.* Birds of prey offer up rich and enjoyable experiences – both for people living or working in Scotland, and for those who visit.

This is the last year for which the Scheme shall produce a report in the present format. For future reports, we shall include data and information on trends in raptor numbers and productivity. We want to develop the evidence base on the changing fortunes of raptors, given the importance of these birds as indicators of the health of our environment. When you think back to the classic work by Derek Ratcliffe on Peregrines and egg shell thinning caused by DDT contamination in the food chain, and many other studies which have raised our awareness of what is happening to the top predators, you almost feel a sense of duty in developing the story on how raptors are faring.

These are challenging times for birds of prey. Whilst the reintroduction programmes gather pace, not least with the consolidation of Red Kites and White-tailed Eagles in Scotland, one has to question why persecution continues to grab headlines. Clearly, there are individuals who are intent on shooting, poisoning or otherwise destroying birds of prey. I suggest we need to find fresh and innovative ways of tackling this matter, for the persistence of the problem betrays a notion that some people, at least, are prepared to take the law into their own hands in killing these birds. This is damaging to Scotland's reputation for environmental stewardship, and of course must serve to undermine the public's support for the people and interests who perpetrate these acts.

Reflecting on the Golden Eagle conservation framework and the follow-up draft frameworks for Hen Harriers and Peregrines, I believe we need to think about the prey base for raptors. In parts of the west Highlands there appears to be an insufficiency of live prey to sustain productive Golden Eagles, and

with a steady increase in the amount of spring rainfall in these parts we may see a downturn in productivity. It is heartening that we are seeing the results of more satellite tracking of Golden Eagles and other raptors, and this is yielding vital information on movements, habitat use and causes of mortality. As we go to press, SNH is running a consultation on behalf of the Scottish Government over proposals to include a further 350,000 hectares of northern and western Scotland within potential Special Protection Areas for Golden Eagles.

These are matters for the future. We need a solid platform of data and information on which to develop work to conserve and manage birds of prey in Scotland. I applaud the work of the Scheme members who have taken the Scheme forward. In particular, I would like to thank the following for all their work: David Stroud (Joint Nature Conservation Committee), Patrick Stirling-Aird, Wendy Mattingley, Alan Heavisides and Jon Hardey (Scottish Raptor Study Groups), Chris Wernham, Liz Humphreys, Staffan Roos and Anne Cotton (British Trust for Ornithology, Scotland), Mark Holling (Rare Breeding Birds Panel), Arjun Amar, Duncan Orr-Ewing and Jeremy Wilson (Royal Society for the Protection of Birds, Scotland), Gordon Riddle (Scottish Ornithologists' Club), Nigel Buxton, Brian Etheridge and the new Scheme Chairman, Andrew Stevenson (Scottish Natural Heritage), and Helen Riley for supporting the secretariat. In particular, I would like to thank the Raptor Monitoring Officer, Brian Etheridge, for leading the compilation of this report, and for his tireless work for the Scheme.

Well done everyone – and thank you.

Des Thompson

Founder Chairman of the Scottish Raptor Monitoring Scheme
February 2010

2 Introduction

This is an interim report by the Scottish Raptor Monitoring Group (SRMG) on the fifth year of the Scottish Raptor Monitoring Scheme (SRMS). The aim of the report is to provide clear and factual information on breeding birds of prey in Scotland during 2007. The format follows closely that used in the previous reports (Etheridge 2005, Etheridge *et al.* 2006, Etheridge *et al.* 2007, Etheridge *et al.* 2008). Following the completion of a review of data submitted to the SRMS, future reports of the scheme will be produced in a different format incorporating trend information for a number of raptor species. More information on this is given in section 3.7 below.

2.1 The Scottish Raptor Monitoring Scheme (SRMS)

The SRMS was established on 24 June 2002 with the signing of an Agreement by the following parties: Scottish Natural Heritage (SNH), Joint Nature Conservation Committee (JNCC), Scottish Raptor Study Groups (SRSGs), British Trust for Ornithology, Scotland (BTO), Rare Breeding Birds Panel (RBBP), Royal Society for the Protection of Birds, Scotland (RSPB), and Scottish Ornithologists' Club (SOC) (Anon., 2002). The SRMS currently focuses primarily on the annual monitoring of the abundance, distribution and breeding success of diurnal birds of prey (Accipitriformes and Falconiformes) and owls (Strigiformes) native to Scotland. Because of its ecological similarity to raptors, the Common Raven is given honorary status as a bird of prey and is included in the Scheme.

2.2 Scottish Raptor Study Groups (SRSGs)

The SRSGs form a consortium of ten regional raptor study groups (Figure 1) active during 2007 with a combined membership of over 240 amateur and professional ornithologists. Members have extensive expertise in the field study of breeding birds of prey and conduct these studies largely in their own time. They have provided the bulk of the data collected in this report on raptor numbers, distribution and productivity. An eleventh group was formed in 2008, the Lewis & Harris Raptor Study Group.

2.3 Scottish Raptor Monitoring Group (SRMG)

The SRMG consists of representatives of the seven organisations who were signatories to the SRMS agreement. They meet up to four times a year and oversee the work of the scheme. A part-time Raptor Monitoring Officer (RMO), funded by SNH and employed by BTO Scotland during the year under review, reports to the group and is primarily responsible for collecting and collating annual breeding records on all raptor and owl species from individuals, SRSGs and other organisations.

Fig 1. Scottish Raptor Study Groups in 2007.

3 Raptor breeding report for 2007

3.1 Introduction to breeding report

Data on breeding raptors, owls and ravens in 2007 were primarily supplied by the ten SRSGs, supplemented by records from RSPB, RBBP and SNH. In addition, important records came from Natural Research Ltd, Haworth Conservation Ltd, RPS Group and from Schedule I licence holders who are not members of the SRSGs via their returns to SNH and BTO. Annex 1 provides a regional breakdown based on Scottish raptor group boundaries (Figure 1) of the home ranges[1] that received at least one visit in the spring of 2007 to check on occupancy. The 4285 home ranges visited represent a 7% increase of the 4004 checked in 2006 and continues the upward trend in reporting. The proportion of home ranges that are occupied by a pair of birds varies by year, species, area and land management. It can approach 100% under the most favourable conditions or be considerably lower where conditions are less favourable. Most home ranges will require a further two visits to confirm the findings of the first. When signs of occupation are present, a minimum of three visits is normally required to assess the outcome of any breeding attempt (Hardey *et al.* 2009). Annex 2 provides a regional breakdown of home ranges holding a potential breeding pair that received further monitoring visits. This reveals that 2614 breeding attempts were effectively monitored, a more modest 3.5% increase over the 2525 in 2006.

3.2 Observer coverage

For some of the scarcer species, such as Red Kite, Marsh Harrier, White-tailed Eagle and Osprey, a high proportion of the breeding population, reaching more than 90-100% for some, is monitored each year, mainly by RSPB personnel and specialist groups. Amongst amateur fieldworkers, the appeal of carrying out fieldwork on open moorland and mountain habitats is strong and four widely but thinly spread upland species, Hen Harrier, Golden Eagle, Merlin and Peregrine Falcon, with national breeding populations in the 400-1200 pair range, receive excellent coverage with up to 50% of the breeding population monitored annually. Also receiving good coverage are two lowland owl species, Barn and Tawny Owl, both because they readily adapt to nest boxes, thus allowing easier study. Common Buzzard and Common Raven attract support from a number of specialist enthusiasts, though there are several substantial regional gaps in coverage for the former offering monitoring opportunities for new fieldworkers. A few species in Scotland, either because of their extreme scarcity (Honey-buzzard and Hobby) or secretive behaviour (Long-eared Owl), present challenges as far as monitoring is concerned. Two widespread species attract little attention from the majority of field workers. Coverage of breeding Sparrowhawks and Kestrels needs to increase if we are to achieve effective monitoring to determine estimates of population size, annual productivity and long-term trends. This requirement is becoming ever more urgent as the status of these two species is now causing concern.

[1] For a definition of terms used in this report, see section 3.4

3.3 Occupation of home ranges

In many species of raptors and owls, breeding pairs are faithful to a home range. In some resident species such as Red Kite, Common Buzzard, Golden Eagle and Common Raven, the pair can remain together throughout the year and for at least part of the day will be on their home range. In migratory species such as Honey-buzzard and Osprey, the pair bond breaks up at the end of the breeding season. If they survive the rigours of migration, the majority of adults will return to the same location the following year and pair up again. In long-lived species, the same pair of birds will typically occupy the same home range, and use the same nesting locations, over many years. For relatively short-lived species such as Hen Harrier, Sparrowhawk and Merlin, providing the habitat remains unchanged, such home ranges may be occupied by a succession of breeding pairs.

Not all home ranges will be occupied by a breeding pair and there are a variety of reasons why a pair of raptors may not breed in a given year e.g. one or both birds may be immature (not yet of breeding age) or food may be in short supply. In some years, only a single bird may be present, caused by the death of a mate or even 'divorce', or recruitment to a new territory if the population is undergoing expansion. Some home ranges may be occupied only when the population reaches a certain level and others may have the appearance of being vacant for long periods, sometimes because of human interference. Others may suffer irreversible habitat changes, e.g. through afforestation, or be subjected to increased human disturbance and may never become regularly occupied again. For these reasons, it is important in the long-term monitoring of Scotland's bird of prey populations, that the presence of unoccupied ranges within a study area is recorded accurately, as well as the occurrences of breeding attempts and any production of young.

3.4 Terminology

The terminologies used in this report have the following definitions and are taken from Hardey *et al.* (2009):

Breeding range - the geographical area within which the species occurs and breeds.

Home range - constitutes the immediate area around the nest site and the area over which a raptor or a pair of raptors forage. Some raptor species, such as Golden Eagle and Tawny Owl, defend more-or-less the entire home range, whereas others, including Goshawks and Kestrels, defend only a core area of the home range around the nest site and have extensive home ranges for hunting which overlap with those of neighbouring pairs.

Nesting range - the locality within a home range that includes all the alternative nests used in successive years by a pair of birds.

Nesting territory - an area around an active nest that is defended by the resident pair of birds against intrusions by other raptors of the same species or against potential predators.

Occupancy - a nesting range is **occupied** if a single bird or pair of birds is recorded during the breeding season, usually on more than one occasion, or if

there is strong evidence that birds are present (moulted feathers, pellets, plucks, faecal splash).

Territorial bird or pair - a single bird or pair that defends a territory against intrusions by other raptors of the same species or against potential predators. For some species, notably Common Buzzard, this territorial behaviour can occur throughout the year and not just during the breeding season.

Breeding pair - a pair that (a) defends a nesting territory in the spring; (b) repairs or builds a nest, or prepares a nest scrape; and (c) lays at least one egg.

Nest site - the nest and its immediate surrounds (e.g. the ledge on which the nest is placed).

Nesting or breeding success - the proportion or percentage of breeding pairs that successfully rear at least one chick to fledging.

Breeding failure - once occupancy by a breeding pair is established, failure occurs if no young fledge successfully. A broader definition will also include those territorial pairs, which appear capable of breeding but fail to lay eggs (this can be difficult to prove without careful and very regular observations).

Productivity - the number of young produced annually, can be expressed in one of three ways: (i) as the mean or average number of young fledged per occupied home range; (ii) the mean number of young fledged per breeding pair, territorial pair or female laying eggs; or (iii) the mean number of young fledged per successful pair or female.

Monitored home range - a home range occupied by a pair that receives sufficient repeat visits to establish the outcome of a breeding attempt.

3.5 Estimating breeding success: a note of warning

Ideally, all breeding attempts should be monitored from the start of pair formation to either breeding failure or the successful fledging of young. In a national report of this size using data from a wide range of field workers, this ideal is not always achievable. The timing of survey visits may bias estimates of raptor breeding success. First visits to an area that occur later in the season will miss breeding attempts that failed early and overestimate nesting success. Non-breeding territorial pairs are a common component in raptor populations and these can be easily overlooked, exacerbating the problem. Therefore, there is a bias in favour of detection of nesting attempts that have a longer period of survival. In particular, nests are most likely to be found and examined at the chick stage; this places a strong positive slant on estimations of breeding success, as failure is more likely to occur at the pre-lay stage or during incubation. Moreover, it was not always possible to determine from data submitted at what stage in the breeding cycle individual nests were found, nor in many cases of nest failure, what caused this to happen. It is hoped that a new nest recording spreadsheet introduced at the start of 2005 (updated in 2009) and now widely adopted by raptor workers will help address these problems.

3.6 Persecution

A large proportion of the uplands, particularly in the south and east of Scotland, are given over to driven grouse shooting, managed by a full-time gamekeeper often with the assistance of one or more under-keepers. The keepers' primary aim is to manage the heather through regular burning and cutting to maximise the number of Red Grouse available for shooting and to control common and widespread predators such as crows, stoats, weasels and foxes. However, recent research has shown that illegal activities directed at birds of prey such as nest destruction and the killing of sub-adults and adults, is adversely effecting the conservation and status of several species. On many driven grouse-moors some raptor species are scarce or absent and many attempts to breed are promptly stopped (Etheridge *et al.* 1997, Hardey *et al.* 2003, Whitfield *et al.* 2004, 2008*)*. This can have a severe effect on species at a local level by reducing the number of breeding pairs present and their breeding success. It will also impact on surrounding populations, if birds are drawn into areas of apparently suitable habitat which is unoccupied because previous inhabitants have been removed – the so-called "black hole" or "ecological trap" effect (Whitfield *et al.* 2004).

Such interference can also diminish the enthusiasm of a volunteer raptor worker for monitoring raptors in what they perceive to be a hostile environment. The consequential impact of this shift of effort away from some grouse-moors, particularly where this form of land management is dominant at the regional scale, is that:

(i) data collected on some raptor breeding populations may not be an accurate reflection of the species status and breeding success in the region. Some upland breeding species such as Hen Harrier, Golden Eagle or Peregrine may appear to have considerably higher occupancy of home ranges, breeding success and productivity than is actually the case nationally across all habitats. This is because in areas not being surveyed occupancy may be low and mortality high compared with other habitat;

(ii) persecution of birds of prey may be under-recorded.

Further SRMS work to more thoroughly assess annual changes in monitoring coverage, and to collect related habitat data to characterise nesting attempts will help to address whether these issues do indeed lead to any biases in the data collected.

3.7 Review of data submitted to the Scottish Raptor Monitoring Scheme

A review of data submitted to the Scottish Raptor Monitoring Scheme is ongoing and will be completed by April 2010. It has taken longer than anticipated to complete this work, which has resulted in a delay to the publication of the 2007 report. Procedures are being put in place for collating and analysing raptor data to speed up the process of annual reporting in future years.

Why is a review needed?

Previous annual reports for the Scheme have presented the data on breeding raptors submitted in each particular year. From 2007, with five years of data available under the Scheme, the Scottish Raptor Monitoring Group proposed to move towards an enhanced report presenting trend information for individual species where the data allow. The incorporation of trend information is important to fulfil objective (b) of the SRMS (Anon., 2002) relating to survey and monitoring, which is as follows:

> "to provide robust information on Scottish raptor populations, in order to determine trends in numbers, range, survival and productivity, and to understand the causes of population changes (Report of the UK Raptor Working Group recommendations 1, 9 and 25, Anon. 2000)."

The following aspects of data quality are being investigated:

1. The constancy of monitoring effort from year to year (in terms of the numbers of nesting attempts reported to the Scheme for each species and whether the same areas tend to be surveyed each year for the same species).

2. The habitat data provided with site records have been reviewed to investigate the potential for investigating trends by habitat type (for example identifying habitats where raptors are more likely to be illegally persecuted).

3. The sample sizes of data by region are being assessed to determine the power to identify trends; in particular focusing on Natural Heritage Zones (Figure 2) which are used by SNH in assessing proposed windfarms and other developments, as well as designated sites such as Special Protection Areas for raptors.

4. Trend analyses are being carried out for a sample of raptor species to develop methods and procedures for data analysis for future years. The species selected to develop trends initially are: Red Kite, Peregrine Falcon, Hen Harrier and Barn Owl. These have been selected because they represent species for which different types of records are submitted to the Scheme each year, such that the challenges in producing trends may also differ.

Outcomes of the review will be templates of species accounts for 2007 and beyond, which will be published on the SRMS website. These accounts will focus on the history of surveying and monitoring for each species as well as information on population changes.

Data reporting and the new SRMS spreadsheet

Initial analyses of Scheme data highlighted some data curation issues which need to be addressed. We need to have fully grid-referenced data, at least to 1-km square resolution, reducing the need to rely on matching site codes and site names between years, and allowing each record to be matched to a region and/or designated site if appropriate. With

regard to information on habitat and land management, of 17,555 individual records that were processed, 7418 (42%) contained entries for nesting habitat and 5315 (30%) included information on the degree of management for country sports in the immediate area, suggesting that plenty of the existing SRMS observers were keen to record this kind of supplementary contextual information on their raptor sites. It was clear from the review, however, that the drop-down menus provided in the recording spreadsheet had in many cases been over-written, such that the standard choice of habitats (and other fields e.g. Nest Site; Nest Type; Management etc) had been modified to suit individual observers. For example, across all raptor species and all five years of data, the field 'Nesting Habitat 1' contained over 400 different descriptions of habitat 'types'. This emphasised the need for improved guidance to increase reporting consistency in future.

To help with data reporting, the existing SRMS electronic recording spreadsheet was revised and re-issued in 2009 along with detailed guidance to observers and SRSG Species Coordinators in order to help them to use the software more effectively.

Reporting on persecution

The SRMG supports the underlying principle that incidents of crimes against raptors and ravens should be reported to the Police and other relevant agencies without delay. It is also important for the SRMS to continue to collect information on human disturbance or other interference at nest sites as objectively as possible so that information/intelligence can be shared with the National Wildlife Crime Unit (NWCU), SNH and RSPB. For all such species, the outcome of breeding attempts reported to the SRMS has been coded using a detailed system with the aim of allowing data on deliberate human disturbance, and other causes of nest failure, to be extracted quickly.

Reporting trends

In preparation for trend reporting, further cleaning is being undertaken for each SRMS species dataset, to ensure that:

(i) As many records as possible have four- or six-figure grid references attached, so that these can be used to (a) link records to specific NHZs or designated sites (SPAs) and (b) match individual nest sites across the years 2003-2007. This initially involves the checking and cleaning of existing grid references. Later we would hope to request additional grid reference information for records that currently lack these.

(ii) Site Codes, Site Names and other potential identifiers (SRSG, observer name, Area/District) have been used consistently for records without grid references, allowing as many of these records as possible to be matched to particular study areas and across the years. Because the previous recording spreadsheet did not require consistency between years in Site Codes, Site Names and other useful variable fields, this involves a lot of manual checking to try to match sites across years.

(iii) Each record (nest site) has a rigorously defined outcome for each breeding season 2003-2007, based on all the information provided by the observer (critically, including information that has been provided in the "Comments" field, so that it cannot be used routinely unless extracted and recoded manually). As far as is possible from the information provided, each record has been objectively allocated an outcome. This is important in order to differentiate, for example: (a) sites that have been checked from those that have not been checked in any given year (noting that sites that have not been checked are often not entered in the data at all but need to be in future); (b) sites that have been monitored through to fledging from those that were only checked for occupancy; (c) sites where the numbers of young fledging have been recorded rigorously.

Emerging results

We have chosen the Peregrine Falcon as the first species to work on because much work was already in place as part of the Peregrine Conservation Framework project. The example tables below show some stages of the work and the sorts of outputs that we need to produce to check the data rigorously and assess the sample sizes available for producing trends in numbers and breeding success through time and for different geographical regions. Please note that the numbers may change a little in future as the clean-up continues and we track down additional records that may mistakenly not have been submitted or have been slightly miscoded.

Table 1. The number of Peregrine Falcon records ready to be used in statistical analyses (e.g. trend analysis) in different stages of the project. The number of records in the original files was 3238, but after deleting a few records that were inputted twice the sample size was reduced to 3231 in the final dataset. Later stages of the project used a smaller subset of this data to answer specific questions on e.g. number if fledglings produced.

Variable	**Number (%) of useable records**		**% increase**
	Original files	**After cleaning and merging**	
Raptor Study Group	3053 (94.3)	3231 (100.0)	5.7
Site code	3151 (97.3)	3231 (100.0)	2.7
Grid reference	657 (20.3)	3029 (93.7)	73.4
Checked	1364 (42.1)	3231 (100.0)	57.9
Occupied	3019 (93.2)	3231 (100.0)	6.8
Young fledged	1916 (59.2)	1914 (59.2)	0
Objective final outcome code	0 (0)	3231 (100.0)	100.0

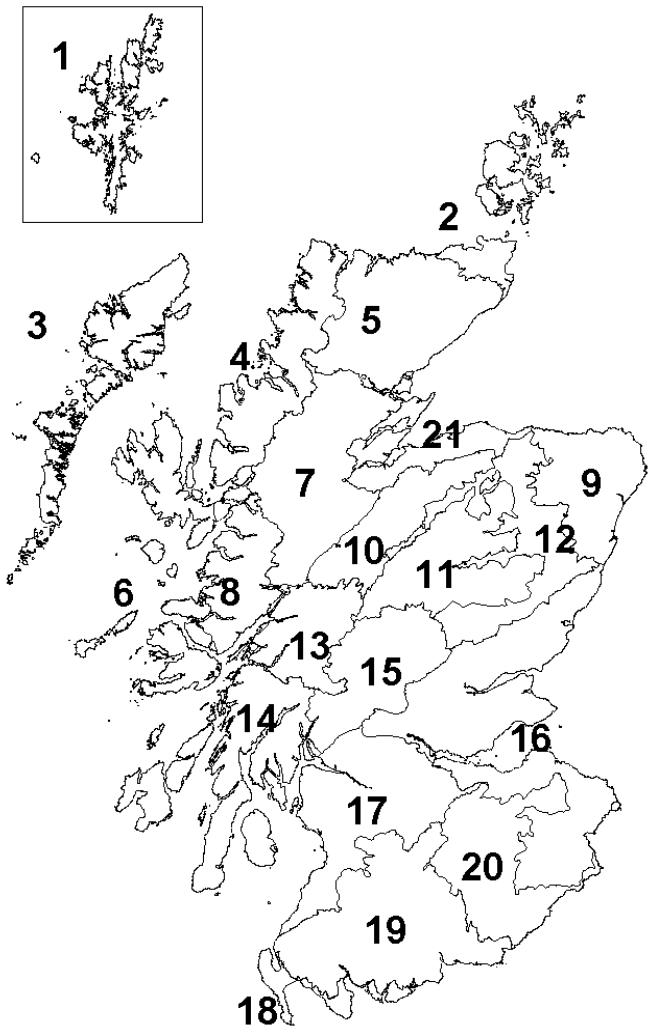

Fig.2. Biogeographic zones of Scotland, termed Natural Heritage Zones (NHZs), developed by Scottish Natural Heritage (SNH, 2002). 1 = Shetland, 2 = North Caithness and Orkney, 3 = Western Isles, 4 = North West Seaboard, 5 = The Peatlands of Caithness and Sutherland, 6 = Western Seaboard, 7 = Northern Highlands, 8 = Western Highlands, 9 = North East Coastal Plain, 10 = Central Highlands, 11 = Cairngorms Massif, 12 = North East Glens, 13 = Lochaber, 14 = Argyll West and Islands, 15 = Breadalbane and East Argyll, 16 = Eastern Lowlands, 17 = West Central Belt, 18 = Wigtown Machairs and Outer Solway, 19 = Western Southern Uplands and Inner Solway, 20 = Border Hills, 21 = Moray Firth.

Table 2. The number of known Peregrine Falcon nesting sites that has been checked for occupancy between the years 2003 and 2007 by the different Raptor Study Groups (RSG) and other contributors in Scotland.

Raptor Study Group (RSG)[1]	Year[2]					Total
	2003	2004	2005	2006	2007	
Argyll RSG	28	31	24	21	26	**130**
Central Scotland RSG	30	35	31	36	35	**167**
Dumfries & Galloway RSG	109	106	102	114	112	**543**
Highland RSG	35	35	22	21	29	**142**
Lothian & Borders RSG	87	85	92	109	144	**517**
North-east Scotland RSG	111	110	100	99	97	**517**
Orkney RSG	15	13	4	0	1	**33**
Other	0	0	6	7	5	**18**
RSPB	0	0	8	8	3	**19**
SNH	0	0	0	9	1	**10**
South Strathclyde RSG	48	47	47	56	51	**249**
Tayside RSG	122	115	111	96	93	**537**
Uist RSG	20	2	13	6	3	**44**
Total	**605**	**579**	**560**	**582**	**600**	**2926**

[1] We are aware that some figures for Argyll RSG, Orkney RSG, Tayside RSG and Uist RSG are lower than in previous Annual Reports, as some records from these areas have been assigned to other organisations, e.g. Other (mainly Natural Research), RSPB and SNH.

[2] Some Total numbers are different compared to previous Annual Reports, mainly because some late submitted records have been included in this table, and because some records from mainly Orkney RSG has never formally been submitted to SRMS. Instead, previous Annual Reports have used the figures published in the Orkney RSG Annual Report.

Table 3. The number of individual grid-referenced Peregrine Falcon sites that was checked for occupancy in the years 2003 to 2007 in each NHZ. In total, 90 site-year combinations that were checked are lacking a grid reference and hence could not be assigned to an NHZ. Therefore the Total is lower here than in Table 2.

	NHZ	Year					Total
		2003	2004	2005	2006	2007	
1	Shetlands	0	0	0	0	0	**0**
2	North Caithness and Orkney	3	14	5	0	1	**23**
3	Coll, Tiree and the Western Isles	21	5	15	17	5	**63**
4	North West Seaboard	5	1	1	1	2	**10**
5	The Peatlands of Caithness and Sutherland	5	5	6	2	6	**24**
6	Western Seaboard	1	3	1	1	2	**8**
7	Northern Highlands	17	12	8	12	9	**58**
8	Western Highlands	0	0	0	0	0	**0**
9	North East Coastal Plain	20	20	19	20	20	**99**
10	Central Highlands	4	7	3	1	5	**20**
11	Cairngorm Massif	94	93	78	77	69	**411**
12	North East Glens	47	39	43	35	30	**194**
13	East Lochaber	3	5	2	2	1	**13**
14	Argyll West and Islands	25	22	28	34	23	**132**
15	Loch Lomond, The Trossachs and Breadalbane	39	41	40	45	40	**205**
16	Eastern Lowlands	72	79	81	82	123	**437**
17	West Central Belt	36	39	39	40	39	**193**
18	Wigtown Machairs and Outer Solway Coast	29	26	22	33	31	**141**
19	Western Southern Uplands and Inner Solway	86	86	85	86	93	**436**
20	Border Hills	65	61	65	70	76	**337**
21	Moray Firth	4	6	6	9	7	**32**
	Total	**576**	**564**	**547**	**567**	**582**	**2836**

The work has also involved producing a series of maps per NHZ to show the distribution of nest sites that have been surveyed each year. This will allow us to assess whether sampling effort is representative and comprehensive in each region, and whether effort has changed through time, important information when deciding whether and how rigorous trends can be produced. We have not included any sample maps here because of sensitivities over the locations of nest sites.

Because the data review is still in progress, the 2007 report for the SRMS does not yet contain trend information. To avoid further delay, the SRMG has decided to produce an interim report for publication on the Scottish Raptor Study Groups website. More complete reporting for 2007, and results for the 2008 and 2009 breeding seasons, will be published later in 2010 as a more comprehensive report.

A report of the 2007 breeding season is presented in section 4 below.

Table 4a. The total number of Peregrine Falcon nesting sites that had been reported to the SRMS between 2003 and 2007 with a grid reference. The table summarises the monitoring (i.e. whether the site was checked or not) per year and by NHZ. It also summarises the occupancy status of the sites that were checked (i.e. excluding sites that were not checked or were submitted with so little information that it was impossible to determine whether the site had been checked or not) per year and by NHZ.

NHZ		Checked	Occupied	Year					Total checked	Total occupancy
				2003	2004	2005	2006	2007		
1	Shetlands	-	-	-	-	-	-	-	0	0
2	North Caithness and Orkney	Yes		3	14	5	0	1	23	
2	North Caithness and Orkney		Single bird	1	0	0	0	0		1
2	North Caithness and Orkney		Pair	2	14	5	0	1		22
3	Coll, Tiree and the Western Isles	No		0	0	0	4	6	10	
3	Coll, Tiree and the Western Isles	Yes		21	5	15	17	5	63	
3	Coll, Tiree and the Western Isles		Unoccupied	4	0	0	3	0		7
3	Coll, Tiree and the Western Isles		Single bird	1	0	0	1	0		2
3	Coll, Tiree and the Western Isles		Pair	16	5	15	13	5		54
4	North West Seaboard	Yes		5	1	1	1	2	10	
4	North West Seaboard		Pair	5	1	1	1	2		10
5	The Peatlands of Caithness and Sutherland	Yes		5	5	6	2	6	24	
5	The Peatlands of Caithness and Sutherland		Unoccupied	0	0	2	2	1		5
5	The Peatlands of Caithness and Sutherland		Single bird	0	0	0	0	1		1
5	The Peatlands of Caithness and Sutherland		Pair	5	5	4	0	4		18
6	Western Seaboard	Yes		1	3	1	1	2	8	
6	Western Seaboard		Pair	1	3	1	1	2		8
7	Northern Highlands	No		0	0	1	0	0	1	
7	Northern Highlands	Yes		17	12	8	12	9	58	
7	Northern Highlands		Unoccupied	4	6	1	4	5		20
7	Northern Highlands		Single bird	3	0	0	0	0		3
7	Northern Highlands		Pair	10	6	7	8	4		35

Table 4a. Continued.

	NHZ	Checked	Occupied	Year					Total checked	Total occupancy
				2003	2004	2005	2006	2007		
8	Western Highlands	-	-	-	-	-	-	-	0	
9	North East Coastal Plain	No		1	1	0	1	2	5	
9	North East Coastal Plain	Yes		20	20	19	20	20	99	
9	North East Coastal Plain		Unoccupied	2	3	3	4	4		16
9	North East Coastal Plain		Single bird	0	2	1	1	1		5
9	North East Coastal Plain		Pair	18	15	15	15	15		78
10	Central Highlands	No		0	0	1	0	0	1	
10	Central Highlands	Yes		4	7	3	1	5	20	
10	Central Highlands		Unoccupied	1	1	1	0	1		4
10	Central Highlands		Fresh signs but no birds	0	0	0	0	2		2
10	Central Highlands		Single bird	0	1	0	0	0		1
10	Central Highlands		Pair	3	5	2	1	2		13
11	Cairngorm Massif	No		10	9	15	23	27	84	
11	Cairngorm Massif	Information deficient		0	0	0	1	0	1	
11	Cairngorm Massif	Yes		94	93	78	77	69	411	
11	Cairngorm Massif		Unoccupied	44	40	34	41	41		200
11	Cairngorm Massif		Fresh signs but no birds	0	0	0	1	0		1
11	Cairngorm Massif		Single bird	5	3	5	3	1		17
11	Cairngorm Massif		Pair	45	50	39	32	27		193
12	North East Glens	No		3	5	5	6	6	25	
12	North East Glens	Yes		47	39	43	35	30	194	
12	North East Glens		Unoccupied	25	17	23	20	21		106
12	North East Glens		Single bird	2	5	2	1	1		11
12	North East Glens		Pair	20	17	18	14	8		77

Table 4a. Continued.

	NHZ	Checked	Occupied	Year					Total checked	Total occupancy
				2003	2004	2005	2006	2007		
13	East Lochaber	Yes		3	5	2	2	1	13	
13	East Lochaber		Unoccupied	0	1	1	0	1		3
13	East Lochaber		Single bird	1	2	1	1	0		5
13	East Lochaber		Pair	2	2	0	1	0		5
14	Argyll West and Islands	Yes		25	22	28	34	23	132	
14	Argyll West and Islands		Unoccupied	4	3	7	6	7		27
14	Argyll West and Islands		Fresh signs but no birds	0	0	0	0	1		1
14	Argyll West and Islands		Single bird	3	3	3	0	0		9
14	Argyll West and Islands		Pair	18	16	18	28	15		95
15	Loch Lomond, The Trossachs and Breadalbane	No		0	0	1	0	1	2	
15	Loch Lomond, The Trossachs and Breadalbane	Yes		39	41	40	45	40	205	
15	Loch Lomond, The Trossachs and Breadalbane		Unoccupied	9	9	10	12	11		51
15	Loch Lomond, The Trossachs and Breadalbane		Single bird	1	3	5	4	4		17
15	Loch Lomond, The Trossachs and Breadalbane		Pair	29	29	25	29	25		137
16	Eastern Lowlands	No		3	3	3	4	3	16	
16	Eastern Lowlands	Information deficient		0	0	0	1	1	2	
16	Eastern Lowlands	Yes		72	79	81	82	123	437	
16	Eastern Lowlands		Unoccupied	12	12	19	19	52		114
16	Eastern Lowlands		Fresh signs but no birds	0	0	0	1	1		2
16	Eastern Lowlands		Single bird	2	5	4	8	9		28
16	Eastern Lowlands		Pair	58	62	58	54	61		293
17	West Central Belt	No		0	0	2	1	0	3	
17	West Central Belt	Yes		36	39	39	40	39	193	
17	West Central Belt		Unoccupied	8	10	4	6	8		36
17	West Central Belt		Single bird	0	0	1	1	1		3
17	West Central Belt		Pair	28	29	34	33	30		154

Table 4a. Continued.

	NHZ	Checked	Occupied	Year					Total checked	Total occupancy
				2003	2004	2005	2006	2007		
18	Wigtown Machairs and Outer Solway Coast	No		3	7	11	0	1	22	
18	Wigtown Machairs and Outer Solway Coast	Yes		29	26	22	33	31	141	
18	Wigtown Machairs and Outer Solway Coast		Unoccupied	8	5	4	8	6		31
18	Wigtown Machairs and Outer Solway Coast		Single bird	0	3	1	4	4		12
18	Wigtown Machairs and Outer Solway Coast		Pair	21	18	17	21	21		98
19	Western Southern Uplands and Inner Solway	No		2	3	4	3	0	12	
19	Western Southern Uplands and Inner Solway	Yes		86	86	85	86	93	436	
19	Western Southern Uplands and Inner Solway		Unoccupied	36	36	40	41	43		196
19	Western Southern Uplands and Inner Solway		Single bird	5	3	5	7	9		29
19	Western Southern Uplands and Inner Solway		Pair	45	47	40	38	41		211
20	Border Hills	No		1	4	2	2	0	9	
20	Border Hills	Yes		65	61	65	70	76	337	
20	Border Hills		Unoccupied	21	25	27	24	32		129
20	Border Hills		Fresh signs but no birds	0	0	0	3	2		5
20	Border Hills		Single bird	0	1	2	2	6		11
20	Border Hills		Pair	44	35	36	41	36		192
21	Moray Firth	Yes		4	6	6	9	7	32	
21	Moray Firth		Unoccupied	0	1	1	2	1		5
21	Moray Firth		Pair	4	5	5	7	6		27
	Total			**1175**	**1160**	**1139**	**1180**	**1208**	**3029**	**2836**

Table 4b. The number of individual Peregrine Falcon nest sites that was occupied by a Peregrine pair during the breeding season with a description of the breeding outcome in the years 2003-2007 in each NHZ (N=1724). For successful nesting attempts (N=987) the productivity is summarised into three groups based on the accuracy of the productivity estimate: i) "Yes" for sites known to have produced fledglings but where the number of fledglings is completely unknown, ii) "Minimum" for sites where the minimum and not the exact number of fledglings is known, and iii) "Absolute" for sites where the exact number of fledglings is known.

NHZ	Outcome	Young fledged	Year					Total outcome	Total fledgling
			2003	2004	2005	2006	2007		
1 Shetlands	-	-	-	-	-	-	-	0	0
2 North Caithness and Orkney	Non-breeding pair		1	0	0	0	0	1	
2 North Caithness and Orkney	Occupied by a breeding pair but outcome unknown		1	8	2	0	0	11	
2 North Caithness and Orkney	Failure unknown causes		0	1	0	0	0	1	
2 North Caithness and Orkney	Failure known weather-related		0	0	1	0	0	1	
2 North Caithness and Orkney	Assumed successful breeding		0	0	0	0	1	1	
2 North Caithness and Orkney	Successful breeding		0	5	2	0	0	7	
2 North Caithness and Orkney		Minimum	0	0	1	0	0		1
2 North Caithness and Orkney		Absolute	0	5	1	0	0		6
3 Coll, Tiree and the Western Isles	Occupied by a breeding pair but outcome unknown		5	2	7	5	0	19	
3 Coll, Tiree and the Western Isles	Failure unknown causes		2	1	2	1	0	6	
3 Coll, Tiree and the Western Isles	Successful breeding		9	2	6	7	5	29	
3 Coll, Tiree and the Western Isles		Yes	1	0	0	0	0		1
3 Coll, Tiree and the Western Isles		Minimum	1	0	0	2	0		3
3 Coll, Tiree and the Western Isles		Absolute	7	2	6	5	5		25
4 North West Seaboard	Occupied by a breeding pair but outcome unknown		4	0	0	0	1	5	
4 North West Seaboard	Successful breeding		1	1	1	1	1	5	
4 North West Seaboard		Minimum	0	1	0	0	0		1
4 North West Seaboard		Absolute	1	0	1	1	1		4
5 The Peatlands of Caithness and Sutherland	Occupied by a breeding pair but outcome unknown		3	0	2	0	2	7	
5 The Peatlands of Caithness and Sutherland	Failure unknown causes		1	2	0	0	1	4	
5 The Peatlands of Caithness and Sutherland	Successful breeding		1	3	2	0	1	7	
5 The Peatlands of Caithness and Sutherland		Minimum	0	2	1	0	0		3
5 The Peatlands of Caithness and Sutherland		Absolute	1	1	1	0	1		4
6 Western Seaboard	Non-breeding pair		0	1	0	0	0	1	
6 Western Seaboard	Occupied by a breeding pair but outcome unknown		0	1	0	0	0	1	
6 Western Seaboard	Successful breeding		1	1	1	1	2	6	
6 Western Seaboard		Minimum	0	1	0	0	0		1
6 Western Seaboard		Absolute	1	0	1	1	2		5

Table 4b. Continued.

NHZ	Outcome	Young fledged	Year					Total outcome	Total fledgling
			2003	2004	2005	2006	2007		
7 Northern Highlands	Non-breeding pair		0	0	0	1	0	1	
7 Northern Highlands	Occupied by a breeding pair but outcome unknown		1	1	1	4	1	8	
7 Northern Highlands	Failure unknown causes		0	0	0	0	1	1	
7 Northern Highlands	Failure suspected intentional anthropogenic cause		0	0	1	0	0	1	
7 Northern Highlands	Successful breeding		9	5	5	3	2	24	
7 Northern Highlands		Yes	1	0	0	0	0		1
7 Northern Highlands		Minimum	1	0	1	0	0		2
7 Northern Highlands		Absolute	7	5	4	3	2		21
8 Western Highlands	-	-	-	-	-	-	-	0	0
9 North East Coastal Plain	Non-breeding pair		0	0	0	2	1	3	
9 North East Coastal Plain	Occupied by a breeding pair but outcome unknown		2	1	0	6	2	11	
9 North East Coastal Plain	Failure unknown causes		10	1	7	0	6	24	
9 North East Coastal Plain	Failure known intentional anthropogenic cause		0	0	0	0	1	1	
9 North East Coastal Plain	Successful breeding		6	13	8	8	5	40	
9 North East Coastal Plain		Minimum	0	0	0	3	2		5
9 North East Coastal Plain		Absolute	6	13	8	5	3		35
10 Central Highlands	Occupied by a breeding pair but outcome unknown		0	1	0	0	0	1	
10 Central Highlands	Failure unknown causes		0	3	0	0	0	3	
10 Central Highlands	Failure suspected intentional anthropogenic cause		0	0	0	0	2	2	
10 Central Highlands	Successful breeding		3	1	2	1	2	9	
10 Central Highlands		Absolute	3	1	2	1	2		9
11 Cairngorm Massif	Non-breeding pair		3	0	0	1	3	7	
11 Cairngorm Massif	Occupied by a breeding pair but outcome unknown		5	10	11	5	6	37	
11 Cairngorm Massif	Failure unknown causes		10	6	8	10	5	39	
11 Cairngorm Massif	Failure suspected intentional anthropogenic cause		1	2	0	1	0	4	
11 Cairngorm Massif	Failure known intrinsic factor		0	1	0	0	1	2	
11 Cairngorm Massif	Failure known unintentional anthropogenic cause		1	0	0	0	0	1	
11 Cairngorm Massif	Successful breeding		25	31	20	15	12	103	
11 Cairngorm Massif		Yes	0	0	0	1	0		1
11 Cairngorm Massif		Minimum	1	2	2	2	3		10
11 Cairngorm Massif		Absolute	24	29	18	12	9		92

Table 4b. Continued.

NHZ	Outcome	Young fledged	Year					Total outcome	Total fledgling
			2003	2004	2005	2006	2007		
12 North East Glens	Non-breeding pair		2	0	1	0	1	4	
12 North East Glens	Occupied by a breeding pair but outcome unknown		3	0	2	3	0	8	
12 North East Glens	Failure unknown causes		3	4	4	0	1	12	
12 North East Glens	Failure suspected intentional anthropogenic cause		0	0	0	1	0	1	
12 North East Glens	Failure known predation		0	1	0	0	0	1	
12 North East Glens	Failure known weather-related		0	1	0	0	0	1	
12 North East Glens	Successful breeding		12	11	11	10	6	50	
12 North East Glens		Minimum	0	0	2	0	0		2
12 North East Glens		Absolute	12	11	9	10	6		48
13 East Lochaber	Failure unknown causes		2	0	0	0	0	2	
13 East Lochaber	Failure known intrinsic factor		0	1	0	0	0	1	
13 East Lochaber	Successful breeding		0	1	0	1	0	2	
13 East Lochaber		Absolute	0	1	0	1	0		2
14 Argyll West and Islands	Non-breeding pair		1	1	1	0	2	5	
14 Argyll West and Islands	Occupied by a breeding pair but outcome unknown		5	3	9	12	6	35	
14 Argyll West and Islands	Failure unknown causes		2	3	2	1	2	10	
14 Argyll West and Islands	Failure presumed natural causes		0	0	0	0	1	1	
14 Argyll West and Islands	Failure known intrinsic factor		0	0	0	2	0	2	
14 Argyll West and Islands	Successful breeding		10	9	6	13	4	42	
14 Argyll West and Islands		Yes	0	2	0	1	0		3
14 Argyll West and Islands		Minimum	0	2	1	3	1		7
14 Argyll West and Islands		Absolute	10	5	5	9	3		32
15 Loch Lomond, The Trossachs and Breadalbane	Non-breeding pair		1	1	0	6	0	8	
15 Loch Lomond, The Trossachs and Breadalbane	Occupied by a breeding pair but outcome unknown		6	5	6	7	5	29	
15 Loch Lomond, The Trossachs and Breadalbane	Failure unknown causes		10	1	5	3	2	21	
15 Loch Lomond, The Trossachs and Breadalbane	Successful breeding		12	22	14	13	18	79	
15 Loch Lomond, The Trossachs and Breadalbane		Yes	0	0	0	0	1		1
15 Loch Lomond, The Trossachs and Breadalbane		Absolute	12	22	14	13	17		78

Table 4b. Continued.

NHZ	Outcome	Young fledged	Year					Total outcome	Total fledgling
			2003	2004	2005	2006	2007		
16 Eastern Lowlands	Non-breeding pair		1	5	1	8	5	20	
16 Eastern Lowlands	Occupied by a breeding pair but outcome unknown		8	5	13	5	1	32	
16 Eastern Lowlands	Failure unknown causes		15	8	7	5	6	41	
16 Eastern Lowlands	Failure presumed natural causes		0	0	0	0	4	4	
16 Eastern Lowlands	Failure suspected intentional anthropogenic cause		0	0	0	0	3	3	
16 Eastern Lowlands	Failure known intrinsic factor		1	2	2	0	0	5	
16 Eastern Lowlands	Failure known predation		0	1	0	0	0	1	
16 Eastern Lowlands	Failure known competition		0	1	0	0	0	1	
16 Eastern Lowlands	Failure known Fulmar-oiled		0	0	1	0	0	1	
16 Eastern Lowlands	Failure known weather-related		0	0	1	0	1	2	
16 Eastern Lowlands	Failure known unintentional anthropogenic cause		0	1	0	1	0	2	
16 Eastern Lowlands	Failure known intentional anthropogenic cause		0	0	1	0	0	1	
16 Eastern Lowlands	Successful breeding		33	39	32	36	41	181	
16 Eastern Lowlands		Yes	0	1	0	0	0		1
16 Eastern Lowlands		Minimum	4	2	6	7	4		23
16 Eastern Lowlands		Absolute	29	36	26	29	37		157
17 West Central Belt	Non-breeding pair		0	0	4	0	1	5	
17 West Central Belt	Occupied by a breeding pair but outcome unknown		0	5	7	1	2	15	
17 West Central Belt	Failure unknown causes		2	3	2	7	1	15	
17 West Central Belt	Failure suspected intentional anthropogenic cause		1	0	1	2	2	6	
17 West Central Belt	Failure known intrinsic factor		1	1	0	0	2	4	
17 West Central Belt	Failure known unintentional anthropogenic cause		1	0	2	1	0	4	
17 West Central Belt	Failure known intentional anthropogenic cause		0	0	1	1	0	2	
17 West Central Belt	Successful breeding		23	20	17	21	22	103	
17 West Central Belt		Yes	0	0	1	0	0		1
17 West Central Belt		Minimum	0	0	2	3	1		6
17 West Central Belt		Absolute	23	20	14	18	21		96

Table 4b. Continued.

NHZ	Outcome	Young fledged	Year					Total outcome	Total fledgling
			2003	2004	2005	2006	2007		
18 Wigtown Machairs and Outer Solway Coast	Occupied by a breeding pair but outcome unknown		3	2	4	1	6	16	
18 Wigtown Machairs and Outer Solway Coast	Failure unknown causes		2	0	0	3	1	6	
18 Wigtown Machairs and Outer Solway Coast	Failure suspected intentional anthropogenic cause		0	1	0	1	1	3	
18 Wigtown Machairs and Outer Solway Coast	Failure known intrinsic factor		0	0	2	1	0	3	
18 Wigtown Machairs and Outer Solway Coast	Failure known unintentional anthropogenic cause		0	0	0	1	0	1	
18 Wigtown Machairs and Outer Solway Coast	Successful breeding		16	15	11	14	13	69	
18 Wigtown Machairs and Outer Solway Coast		Yes	2	0	0	0	0		2
18 Wigtown Machairs and Outer Solway Coast		Minimum	1	7	2	3	4		17
18 Wigtown Machairs and Outer Solway Coast		Absolute	13	8	9	11	9		50
19 Western Southern Uplands and Inner Solway	Non-breeding pair		0	0	2	0	2	4	
19 Western Southern Uplands and Inner Solway	Occupied by a breeding pair but outcome unknown		10	6	5	3	5	29	
19 Western Southern Uplands and Inner Solway	Failure unknown causes		8	2	2	1	3	16	
19 Western Southern Uplands and Inner Solway	Failure presumed natural causes		0	0	1	1	2	4	
19 Western Southern Uplands and Inner Solway	Failure suspected intentional anthropogenic cause		6	5	6	3	4	24	
19 Western Southern Uplands and Inner Solway	Failure known intrinsic factor		2	2	0	2	1	7	
19 Western Southern Uplands and Inner Solway	Failure known predation		0	1	0	0	0	1	
19 Western Southern Uplands and Inner Solway	Failure known weather-related		1	1	1	0	0	3	
19 Western Southern Uplands and Inner Solway	Failure known unintentional anthropogenic cause		3	2	0	0	0	5	
19 Western Southern Uplands and Inner Solway	Failure known intentional anthropogenic cause		0	1	2	5	0	8	
19 Western Southern Uplands and Inner Solway	Successful breeding		15	27	21	23	24	110	
19 Western Southern Uplands and Inner Solway		Yes	1	0	0	0	0		1
19 Western Southern Uplands and Inner Solway		Minimum	0	1	1	2	2		6
19 Western Southern Uplands and Inner Solway		Absolute	14	26	20	21	22		103

Table 4b. Continued.

NHZ	Outcome	Young fledged	Year					Total outcome	Total fledgling
			2003	2004	2005	2006	2007		
20 Border Hills	Non-breeding pair		0	1	3	4	9	17	
20 Border Hills	Occupied by a breeding pair but outcome unknown		5	4	5	4	1	19	
20 Border Hills	Failure unknown causes		9	0	4	8	3	24	
20 Border Hills	Failure suspected intentional anthropogenic cause		4	6	2	1	4	17	
20 Border Hills	Failure known intrinsic factor		1	0	0	0	0	1	
20 Border Hills	Failure known Fulmar-oiled		0	0	1	0	0	1	
20 Border Hills	Failure known weather-related		1	0	1	0	0	2	
20 Border Hills	Failure known falling object		0	1	0	0	1	2	
20 Border Hills	Failure known intentional anthropogenic cause		2	3	1	2	1	9	
20 Border Hills	Successful breeding		22	20	19	22	17	100	
20 Border Hills		Yes	1	0	0	0	0		1
20 Border Hills		Minimum	3	0	0	0	0		3
20 Border Hills		Absolute	18	20	19	22	17		96
21 Moray Firth	Occupied by a breeding pair but outcome unknown		0	0	0	3	0	3	
21 Moray Firth	Failure unknown causes		1	0	0	0	1	2	
21 Moray Firth	Failure presumed natural causes		0	0	0	0	1	1	
21 Moray Firth	Successful breeding		3	5	5	4	4	21	
21 Moray Firth		Minimum	0	0	1	0	0		1
21 Moray Firth		Absolute	3	5	4	4	4		20
Total								**1724**	**987**

4 Species accounts

4.1 European Honey-buzzard *Pernis apivorus*

Adult birds were reported during the summer from five locations where breeding has been reported or strongly suspected in past years. Three were in Highland where a nest was found from which a single chick fledged and one each in Tayside and Dumfries & Galloway. This species remains very scarce in Scotland but is easily overlooked and current fieldwork is believed to greatly underestimate the status of this trans-equatorial migrant.

4.2 Red Kite *Milvus milvus*

The Red Kite, once a widespread native species in Great Britain, was rapidly exterminated throughout Scotland during the 19th century. There have been three phases of Red Kite re-introduction: 1989-93 on the Black Isle, Highland; 1996-2001 near Doune, west Perthshire and 2000-05 at Loch Ken, Galloway. These schemes resulted in a slowly increasing and expanding population (Table 5) that has been closely monitored by RSPB staff. Apart from the Black Isle population, which showed no increase over the previous year, this expansion was maintained in 2007. A minimum of 93 pairs laid eggs (Table 6), a modest 8% increase from 2006. Breeding success at 78% was below the long-term mean for the previous ten-year period (84%) but the population fledged 162 young, the highest number to date. A fourth re-introduction scheme was started in 2007 on the outskirts of the City of Aberdeen using chicks collected primarily from the very successful population in southern England. Thirty juveniles were released in August but breeding was not expected before 2009. Unfortunately, in Scotland the species still suffers from a high level of persecution mainly through the continued use of illegal poisoned baits in the countryside and 12 Red Kites were victims to poison abuse during the year (RSPB 2009). The impressive increase in breeding numbers and expansion of range achieved by re-introduced populations in England will not be matched by Scottish Red Kites until this criminal behaviour ceases or is greatly curtailed (Smart *et al.* in press).

Highland

It was another disappointing year for Highland Red Kites. Forty-one pairs were located from which forty pairs were monitored including one that failed early or was non-breeding. Clutches of eggs were laid by 39 pairs; the same number as 2005 and 2006. Thus, the breeding population has remained unchanged for three years despite excellent productivity over the previous years. Poor recruitment into the breeding population caused by high levels of persecution is the problem (Smart *et al*. in press). To illustrate the impact of illegal killing, during the period 2001-05, 401 young kites fledged in Highland but only 15 (<4%) have been recorded breeding in later years (RSPB unpublished data). In 2007, breeding success fell to 70%, the lowest figure since 1993 (60%) when the population stood at five pairs. Of the failures recorded in 2007, nine occurred during incubation and two during the nestling period. Furthermore, just 65 young fledged, the lowest number since 1999. Mean brood size was 1.6 young per monitored pair.

Central Scotland & Tayside

The populations in these two areas share a common origin – the reintroduction scheme that was centred at Doune, near Stirling. For the first time, the number of pairs located in this area exceeded those found further north in Highland despite the seven-year time difference between the start of the two schemes. Forty-six pairs were present, an increase of 18% over the previous

year. Although 41 pairs were monitored closely, only 33 laying pairs were confirmed and just 26 (63%) were successful in their breeding attempt. They reared 59 young to fledging; a mean brood size per monitored pair of 1.4.

Central Scotland
Twenty-six pairs were located and 20 were confirmed to lay eggs. Fifteen successful pairs (75%) reared 35 young.

Tayside
Even though 20 pairs were located in the spring, breeding could only be confirmed for 13. There were two failures and 11 pairs reared 24 young.

Dumfries & Galloway

Twenty-two breeding pairs were monitored. There were three failures, one at an early pre-lay stage and two during incubation. Nineteen successful pairs (86%) fledged 38 young, a mean brood size of 1.7 per monitored pair.

4.3 Black Kite *Milvus migrans*

A male Black Kite that was recorded in Highland in the spring and summer of 2005 and bred successfully with a female Red Kite in 2006 (Etheridge *et al.* 2008), was not seen during 2007.

4.4 White-tailed Eagle *Haliaeetus albicilla*

White-tailed Eagles were exterminated in Scotland by about 1918 following a prolonged period of persecution. A breeding population became re-established along the northwest maritime fringe of Scotland (Table 7), following the release of fledglings from Norway carried out in two phases; 1975-85 and 1993-98. A recent demographic study has shown that breeding success of this population increased over time as the average age and experiences of individual eagles increased (Evans *et al.* 2009). Furthermore, this success tended to be higher where one or both adults were wild-bred. To quote the summary from the RSPB sea eagle project Newsletter (Crawford *et al.* 2008): "2007 was an exciting year for Sea eagles in Western Scotland. Six new pairs were located, bringing the total number of occupied territories to 42. The new pairs were widely spaced, expanding the breeding range of the species to the north, south and east. Thirty-five pairs laid eggs and 31 broods hatched. Twenty-four pairs bred successfully fledging a record 34 young". The growth of the population since 1996 is shown in Table 8.

4.5 Eurasian Marsh Harrier *Circus aeruginosus*

A poor breeding season was experienced in 2007 for the very vulnerable Scottish population. Eight pairs were located in the spring (Table 9) but one pair in Orkney apparently failed at an early stage. Seven pairs were again found in the Tay reed beds, however, only four were thought to lay eggs and just two pairs reared a disappointing total of three young. No birds were reported from any of the Northeast Scotland or Highland locations where breeding occurred in 2005 and 2006.

4.6 Hen Harrier *Circus cyaneus*

Hen Harriers are considered the most persecuted raptor in the UK due to their perceived conflict with grouse management (Etheridge *et al.* 1997, Anderson *et al.* 2009). As a result, they are now absent or scarce as a breeding species over large tracts of heather moorland in eastern and southern Scotland. This is reflected in breeding records summarised in Table 10 with low numbers of pairs located and poor breeding success in areas with a high proportion of driven grouse-moors. These conditions occur over much of much of upland eastern Inverness-shire, Aberdeenshire, Angus, South Strathclyde, Lothian & Borders and Dumfries & Galloway where only 38% of monitored pairs bred successfully compared with the Scottish average for all habitats and regions of 69% (Table 11). Persecution as a constraint on the Scottish population is currently being investigated under the SRMG Hen Harrier framework analysis.

During the spring, visits were made to 415 known Hen Harrier home ranges, of which 298 (72%) were occupied (Tables 10 & 11). Regular repeat visits were made to 253 of these and nests with eggs were found at 213 (84%). There were 147 successful nests (69%) fledging 432 young. Although occupancy of home ranges declined for the third year in a row and was lowest during the 5-year period 2003-07, the higher proportion of pairs with nests and eggs, combined with their increased productivity, resulted in an improved breeding season in 2007 compared with the previous two years (Table 11).

The regions used for this account are those used for national Hen Harrier surveys (Figure 3) rather than the regions defined by the raptor study groups (Figure 1).

Orkney

The majority of Hen Harrier breeding attempts are monitored annually and 64 home ranges were occupied in 2007. At a third of these (33%), the breeding attempt failed prior to the commencement of egg laying or very soon after it was completed. This high failure rate is a recent characteristic of the Orkney population and is associated with reduced prey availability during the early part of the breeding season (Amar *et al.* 2005). There were 43 confirmed nests with eggs, of which 26 (60%) hatched at least one young. Fledging success was high and 25 pairs (96%) fledged in total 75 young. Mean brood size per monitored occupied home range was 1.2 young.

Hebrides

In the outer island chain of the Uists and Benbecula, 44 occupied home ranges were located. Monitoring efforts were carried out on 29 pairs, all of which laid eggs. Twenty-three pairs (79%) reached the hatching stage and all 23 succeeded in fledging young. The 66 young produced give a mean brood size per monitored occupied home range of 2.3.

On the inner Hebridean islands of Skye and Eigg, 23 home ranges were checked and 13 (57%) found occupied. Twelve breeding pairs were monitored, all hatched their eggs but two-thirds of the broods on Skye were lost prior to fledging. Red Fox *Vulpes vulpes* predation was considered the most likely cause of the six failures recorded. On Eigg where foxes are absent, all three harrier broods were successful. Mean brood size per monitored occupied home range was 1.7 young.

North Highlands

Twenty-two known breeding home ranges were visited and 14 (64%) held pairs. Of these, nine were monitored but one pair failed at an early stage and deserted the site. Eight pairs laid eggs, six pairs hatched and five pairs (63%) produced 17 flying young. Mean brood size per monitored occupied home range was 1.9 young.

East Highlands

There was a marked contrast in the number of pairs located and their productivity in the East Highlands depending on location and the proportion of heather moor that is managed for driven grouse-shooting. In Aberdeen & Kincardineshire, a former stronghold of this species, five pairs were located, but only two bred successfully, rearing broods of two and one. Hen Harrier is apparently extinct as a breeding species in Angus; none of 15 home ranges checked were occupied. By contrast, in Perthshire, pairs were found at 28 (64%) of 44 home ranges checked and 24 (86%) pairs bred successfully fledging 79 young. To the north, in Moray & Nairn, on moorland not managed for grouse, six successful pairs reared 12 young. Combined, the mean brood size per monitored occupied home range was 2.4 young.

West Highlands & islands

During the later half of the 20th Century, the vast young forest plantations of the region, such as those established on the mainland in Kintyre, Cowal and the Trossachs, supported much of the burgeoning Hen Harrier population. More recently, these early forests have matured and the planting of new woodland in the uplands has been much reduced. Nonetheless, this region, particularly the islands, still holds a very important proportion of the Scottish breeding population. This is reflected in Table 11; five island populations contributed 85% of the breeding records for the region. Overall, 71 (65%) pairs were located at 110 home ranges checked. Sixty received further monitoring visits. There were five early season failures. Of 55 clutches laid, 46 (84%) hatched and 41(75%) fledged at least one young. One hundred and four fledged young were counted, giving a mean brood size per monitored occupied home range of 1.7 young.

Southwest & Southern Uplands

For the past four years, this region has attained the lowest Hen Harrier productivity of the five outside of Orkney. This distinction continued in 2007 with a mean brood size per monitored occupied home range of 1.4 young, despite this being a big improvement of the 0.8 figure in 2006. The main problem in the Southwest and Southern Uplands is the high nest failure rate, much of it due to human interference. Of 40 pairs monitored, eight (20%) failed before laying, nine (23%) failed during incubation and a further eight (20%) during the nestling period. The 15 nests that succeeded produced 56 young, nearly four young each, suggesting this region has the potential to be very productive.

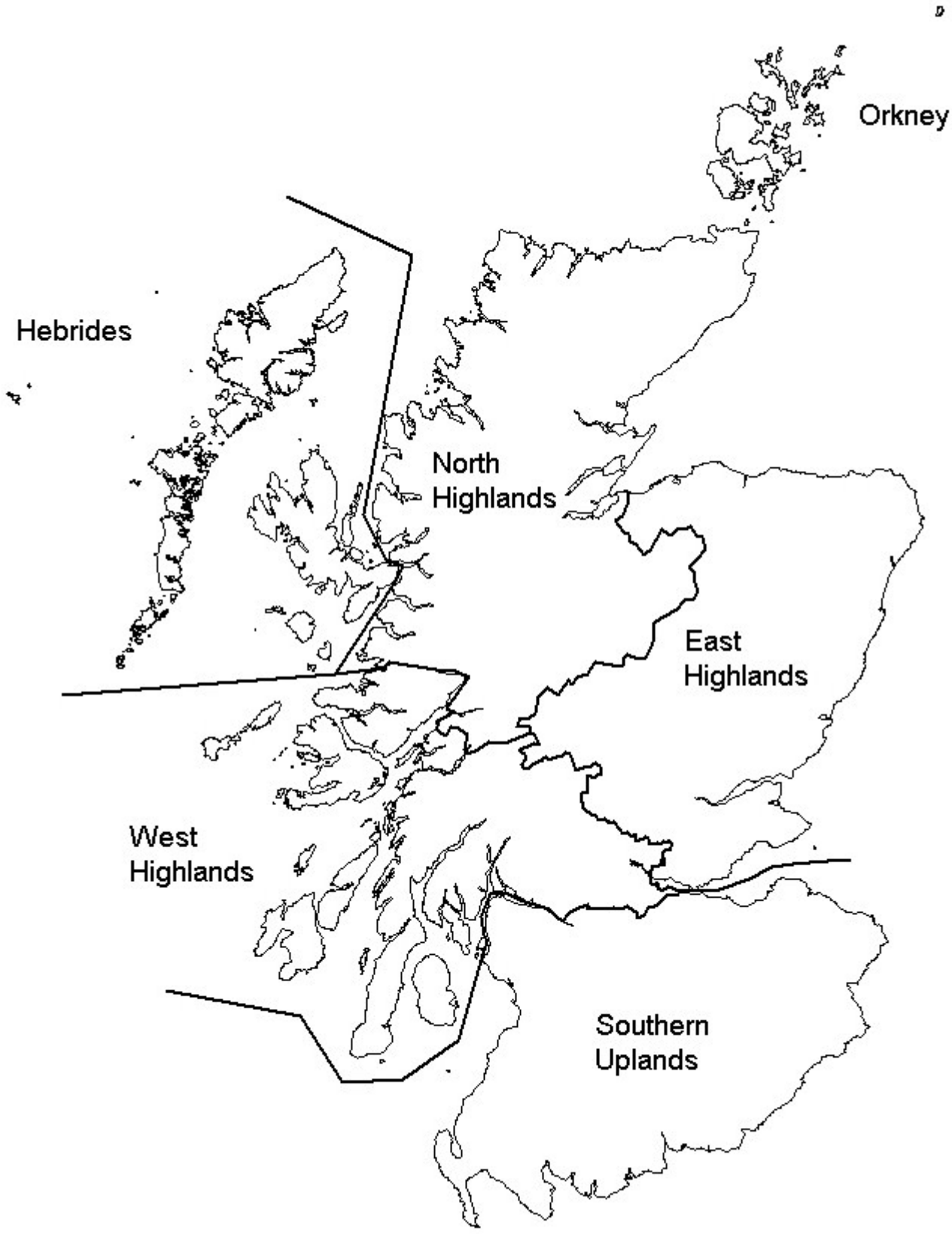

Fig 2. Location of the regions used to summarise Hen Harrier breeding data in this report and in the 1988/89, 1998 and 2004 national surveys (from Sim *et al*. 2007).

4.7 Northern Goshawk *Accipiter gentilis*

An increase in coverage was achieved in 2007 in the breeding strongholds in Northeast Scotland, Lothian & Borders and Dumfries & Galloway (Table 12). Checks were carried out at 136 home ranges and there was evidence of occupancy at 87 (64%). Further monitoring visits were carried out at 73 locations and nests with eggs were confirmed for 70 pairs. There were ten failures (14%) during incubation but fledging success was 100% with the remaining 60 nests rearing a minimum of 127 young. Productivity was 1.7 fledged young per monitored occupied home range.

Highland

Goshawks are undoubtedly overlooked in the vast mature forests of the region, as bird-watchers regularly report sightings of birds. Only three home ranges were checked for occupancy in the spring and there were signs at just one, but no further visits were made.

Northeast Scotland

Thirty-eight home ranges were visited and 24 were occupied and received further checks. Breeding pairs with nests were confirmed at 23 and 17 (74%) were successful rearing a minimum of 32 young. The mean brood size per monitored occupied home range was 1.3.

Tayside

A single breeding pair was monitored and reared three young.

South Strathclyde

Signs of occupancy were confirmed at four locations but there were no follow up visits.

Lothian & Borders

Along with adjoining Dumfries & Galloway, this constitutes the most important area in Scotland for breeding Goshawk and is subject to a long-term study by a small group of dedicated fieldworkers. Fifty-nine home ranges were checked in the spring and occupancy was recorded at 40 (68%). Monitoring efforts were concentrated at 31 and breeding was confirmed at 30. Hatching success was high at 27 (90%) and all 27 succeeded in fledging young. The 62 young counted at these nests give a mean brood size per monitored occupied home range of 2.0.

Dumfries & Galloway

Monitoring effort has increased in recent years and is now revealing the extensive range in south Scotland of this forest dwelling raptor. Checks were made at 31 known home ranges and 17 (55%) were found occupied, the lowest proportion of the three main study areas in Scotland. Of these, 16 pairs were confirmed as laying eggs and 15 succeeded in hatching and rearing 30 young. The mean brood size per monitored occupied home range was 1.8.

4.8 Eurasian Sparrowhawk *Accipiter nisus*

A welcome improvement in monitoring and reporting of breeding Sparrowhawks occurred in 2007 and resulted in 104 home ranges being checked in the spring (Table 13), an increase of 24% over the previous year. There were signs of occupancy at 67 (64%) home ranges and 55 were closely monitored, revealing 52 pairs had laid eggs. Forty-five (87%) reached the

hatching stage and 42 (81%) fledged at least one young. A minimum of 135 young fledged giving a mean brood size per monitored occupied home range of 2.5.

Orkney

Eight out of 14 home ranges were occupied and six were monitored. Three pairs laid eggs and hatched them, but only one succeeded, rearing three young.

Uist

Sparrowhawks have been suspected of nesting at four localities in these largely treeless islands in past years. In the spring, three sites bore signs of occupation but only one breeding pair was confirmed, which reared two young.

Highland

Two occupied home ranges were monitored. Both were successful and reared nine young.

Tayside

Three successful breeding pairs reared a minimum of seven young.

Argyll

Visits were made to 22 home ranges and 12 (55%) showed signs of occupancy. Five breeding pairs were monitored and all five were successful in rearing young. A minimum count of 11 fledged young was probably an under-estimate.

South Strathclyde

There was a 12.5% increase in the number of breeding pairs monitored in this important study population compared with last year and although breeding success showed a small decline, brood sizes were larger and productivity was unchanged. Fifty-seven home ranges were checked and 37 (65%) were occupied. Follow-up visits were made to 36 and all had pairs with eggs. Twenty-nine pairs (81%) hatched chicks and 28 (78%) succeeded in rearing a minimum 97 young. However, six of the broods could not be counted and were assessed as 1+. Given a mean brood size per monitored occupied home range of 3.2, it is likely that around 117 young fledged, the same figure as 2006. One nest contained a clutch of 11, the product of two females laying eggs in the same nest. Unfortunately, this remarkable clutch was subsequently found deserted; often the fate of a nest attended by two females (Newton, 1986).

Dumfries & Galloway

Two active nests were monitored, each producing three young.

4.9 Common Buzzard *Buteo buteo*

The return of the Common Buzzard (hereafter Buzzard) to its former haunts in the east (Holling 2003) and the public's increasing familiarity with the species is one of the more welcome ornithological occurrences of recent times. The Buzzard is currently more abundant in Scotland than it has been for over 200 years and it is important that the monitoring of home ranges by enthusiasts is maintained at the current high level to detect further change. During 2007, a minimum of 652 home ranges was checked for occupation and 528 (81%) held Buzzard pairs (Table 14). Of the occupied home ranges, 410 received further visits. Clutches were laid at 360 (88%) and at the remaining 50 home ranges (12%), the pair either failed early

or were thought to be non-breeding. Hatching success at 319 nests (89%) and fledging success at 307 (85%) were high and at least 590 flying young were produced. Productivity was 1.4 young per monitored occupied home range.

Orkney

Buzzards are surprisingly scarce on Orkney and 2007 was another disappointing year. Two pairs were located in the spring but there was only one breeding attempt, producing a single chick.

Uist

There were 29 pairs located on territory in the spring. Eight breeding pairs were monitored of which seven produced 14 young.

Highland

Survey effort was based on the Isle of Eigg (6 home ranges), Caithness and Sutherland (29), Ross-shire (70) and Inverness & Badenoch (16). In total, pairs were present at 116 home ranges in the spring and 112 received further visits. At ten of them, the pair failed early or was non-breeding. Of the remaining 102 pairs, 86 (84%) hatched young and 83 (81%) produced 161 young. Mean brood size per monitored occupied home range was 1.4 young.

Northeast Scotland

In a study area east of the Grampians, 136 home ranges, where breeding was known to have previously occurred, were checked in the spring. There were signs of occupation at 89. A sample of 28 breeding attempts was monitored from which 23 (82%) hatched and reared young. A minimum of 36 young fledged; a mean brood size per monitored occupied home range of 1.3 young.

Tayside & Fife

Thirteen occupied home ranges held breeding pairs. There were two nest failures, the remaining 11 pairs produced 19 fledged young. Mean brood size per monitored occupied home range was 1.5 young.

Central Scotland

As part of a long-term study, spring checks were carried out at 158 known home ranges of which 139 (88%) were occupied by a pair of birds. Monitoring visits to 112 occupied home ranges revealed that clutches of eggs were laid at 106 (95%). Of these, 94 reached the hatching stage (89%) and 93 (88%) fledged 170 young, giving a mean brood size per monitored occupied home range of 1.5 young.

Argyll

Monitoring work was carried out in the Cowal peninsula (23 home ranges) and on the islands of Colonsay (58), Islay (5) and Bute (49). In total, 135 known home ranges were checked and pairs were present at 89 (66%). Monitoring effort was concentrated on 84 but it is thought that at 33 home ranges (39%), the pair was either non-breeding or had failed at an early stage in the breeding cycle. This relatively high early failure rate was particularly noticeable on Colonsay and in the Cowal peninsula. Of the remaining 51 breeding pairs, 46 succeeded in fledging 87 young. The mean brood size per monitored occupied home range was a disappointing 1.0 young.

Lothian & Borders

Forty-two home ranges occupied by breeding pairs were monitored, of which 35 (83%) produced 85 young. Mean brood size per monitored occupied home range was 2.0 young.

Dumfries & Galloway

Nine breeding pairs were monitored in the spring. There was a single failure, and eight pairs (89%) fledged 17 young. Mean brood size per monitored occupied home range was 1.9 young.

4.10 Golden Eagle *Aquila chrysaetos*

During the current decade, the Golden Eagle population in Scotland, estimated at 440 pairs (Eaton *et al.* 2007), has been the subject of detailed studies culminating in several important papers and reports (e.g. Whitfield *et al*. 2004, 2008). Research has shown the species currently fails to meet favourable conservation status targets in some regions. Low food availability in the west Highlands is impacting breeding productivity but the adverse effect of persecution occurring on land managed for grouse shooting in both the eastern Highlands and Southern Uplands was found to be impinging on survival and ultimately, population size, such that in the latter region eagles are threatened with extinction. In the face of such illegal activity, it is vital that the current level of monitoring in Scotland be maintained and ideally enhanced to cover more of the recorded eagle home ranges in the east and south, unoccupied in past national surveys, in order to record any evidence of re-colonisation or further range contraction.

In 2007, checks were carried out at 291 home ranges, throughout the known breeding range in Scotland (Table 15). These visits showed that pairs were present at 227 (78%) home ranges, twelve of which were pairs containing at least one bird in immature plumage. In addition, signs of occupation or a single unpaired bird were present at 26 (9%) home ranges and 38 (13%) were unoccupied. Two hundred and sixteen pairs were monitored, of which 152 (70%) were confirmed to lay eggs. The remaining 64 (30%) failed at an early stage in the breeding cycle or were non-breeders. These figures are very similar to those from 2006. Of the laying pairs, 106 (70%) reached the hatching stage and 92 (61%) fledged at least one chick. Twelve pairs (13% of those fledging young) succeeded in raising two chicks so that the minimum number of young fledged was 104. Overall, of the 216 monitored pairs, 43% bred successfully producing a mean of just under 0.5 young per occupied home range. This level of productivity was a small improvement over the previous year.

Lewis & Harris

Welcome data on the important Lewis & Harris eagle population was received for the first time in 2007. Three occupied home ranges were monitored; two were successful, each producing a single chick.

Uist

Almost complete coverage was again achieved with the checking of 26 known eagle home ranges. All were occupied, 25 by pairs and one by a single bird. Twenty-three pairs were monitored and at least 18 (78%) laid eggs. Fourteen pairs (61%) reached the hatching stage but only 10 (43%) were successful in rearing any young. The eleven young fledged give a mean brood size of just under 0.5 young per monitored occupied home range, an improvement on the 0.3 estimated for 2006.

Highland

This vast and largely mountainous region holds a large proportion of the Scottish population of Golden Eagles (Eaton *et al.* 2007). Excellent coverage of home ranges was achieved particularly in the west on the Isle of Skye, and in Ardnamurchan and west Inverness-shire. One hundred and twenty-four home ranges were checked of which 92 (74%) were occupied by pairs, with single birds (mainly immature) occupying an additional 10 (8%). Eighty-eight pairs were monitored of which 31 (35%) either failed early or were non-breeding. Of the 57 pairs that were confirmed breeding, only 30 (34% of monitored pairs) succeeded in rearing any young. The 35 young produced give a mean brood size per pair of 0.4 young per monitored occupied home range, only a slight improvement on 2006 (0.3 young).

Northeast Scotland

Twenty known home ranges all lying within the former Grampian region were again checked and 15 (75%) were found occupied by pairs. An additional three (15%) held single birds. The proportion of pairs where at least one member was in immature plumage was 20%, considerably higher than the national average of 5% in 2007. Fourteen pairs were monitored but only seven pairs (50%) were confirmed to lay eggs and just four pairs (29%) produced any young. The five young that fledged give a mean brood size of less than 0.4 young per monitored occupied home range.

Tayside

Early spring checks of occupancy were made at 29 home ranges and 18 (62%) pairs and six (21%) single birds were found. Seventeen pairs received follow-up visits. Twelve pairs (71%) definitely bred and laid eggs, the remaining five pairs either failed early or were non-breeding. Breeding success was high amongst the confirmed egg layers with just a single failure. Moreover, with four cases of twins being reared, the mean brood size per occupied monitored home range was a healthy 0.9 young. Breeding Golden Eagles monitored in Tayside over the past 5 years have consistently been shown to have the highest nesting success and productivity of any region. However, the high proportion of territories without breeding pairs (38%) is indicative of a continuing high level of persecution (Eaton *et al.,* 2007, Whitfield *et al.,* 2004).

Central Scotland

The Golden eagle population of this region has remained at seven or eight pairs for the past 5-years. Eight pairs were present in 2007 and six received regular monitoring. One pair failed early or was non-breeding. The five pairs all laid eggs and succeeded in hatching them, but one failed at the chick stage. The remaining four pairs reared a single chick each.

Argyll

After the Highlands, this region supports the highest number of breeding pairs of eagles in Scotland. Seventy-five home ranges were checked for occupation and 62 (83%) held pairs and single birds were present at six (8%). Monitoring checks were carried out on 61 of the pairs. A high proportion of 13 (21%) either failed early or was not breeding. This was mainly a problem on Mull & Jura where 11 of 26 pairs (42%) monitored were in this category. Across the region, of the 48 pairs that were known to lay eggs, 33 (69%) hatched at least one egg and 29 fledged young. Apart from a single brood of two, all were single chicks.

Lothian & Borders

Three home ranges were visited and two breeding pairs were found. One pair bred successfully rearing a single chick.

Dumfries & Galloway

The two home ranges checked were each occupied by a pair of Golden Eagles but only one was confirmed as laying eggs and subsequently fledged a single chick. The other either failed at an early stage of the nesting cycle or was non-breeding.

4.11 Osprey *Pandion haliaetus*

A reduction in the number of breeding Ospreys monitored was a cause for concern in the 2006 report (Etheridge *et al.*, 2008) and this decline has unfortunately continued in 2007 (Table 16), albeit at a reduced rate. This is despite the fact that the species can be one of the easiest to monitor long-term on account of its often conspicuous nest being used for many years by a succession of breeding pairs (Dennis 2008). However, as the species' range expands, it will not be possible to monitor all pairs in all years and a sampling approach will have to be adopted. Of the 198 known nests[1] checked in the spring, 140 (70%) held pairs, of which 138 pairs were monitored. Nineteen pairs (14%) failed early or were possibly non-breeding. Of the remaining 119 pairs that bred, 95 (69% of those monitored) reached the hatching stage and 92 (67%) successfully reared 182 young. The mean brood size per monitored occupied nest site was 1.3 young, down on the 1.5 estimated for 2006.

Highland

The northern Highlands are home to the largest population of Ospreys in Britain. Spring visits were made to 106 nest sites at which 67 (63%) pairs were present. Further visits were made to confirm the breeding status of 65 pairs. At least 56 laid eggs, though it is likely this figure was higher as some pairs may have failed early. Forty-one (63%) pairs succeeded in rearing young. The 79 fledged young counted give a mean brood size of 1.2 young per monitored occupied nest site.

Northeast Scotland

Overall, 2007 was a disappointing year for Ospreys in Northeast Scotland. Although the same number of pairs was monitored as in the previous year, fewer were successful and there was a 35% decline in the number of young produced. Thirty-three nest sites were checked for occupancy in the spring and pairs were present at 19 (58%). Seven pairs (37%) were unsuccessful in their breeding attempt. Three pairs failed early or were non-breeding and a further four failed at a later stage. The remaining 12 pairs produced 22 young, giving a mean brood size of 1.2 per monitored occupied nest site.

Tayside

Data on 13 breeding pairs was received, the lowest total since the start of the SRMS in 2003. One pair either failed early or was non-breeding, but the remaining 12 pairs all bred successfully, rearing 20 young. Mean brood size was 1.5 young per monitored occupied nest site.

[1] The term 'home range' is not appropriate for this species. Ospreys differ from other hawks and falcons that are covered in this report in that the nest site rather than the home range is treated as the monitoring unit. This is because Ospreys build large conspicuous nests that are reused annually and are the focus of their territorial behaviour.

Central Scotland

Twenty-two nest sites were checked and 18 pairs were found. Five pairs (28%) failed in their breeding attempt. The 13 successful pairs reared 32 young; a mean brood size of 1.8 young per monitored occupied nest site.

Argyll

Twelve pairs were present at the 13 nest sites checked in the spring, a small increase over 2006. There was just a single breeding failure with 11 pairs fledging 22 young. Mean brood size was also 1.8 young per monitored occupied nest site.

Lothian & Borders

Ospreys are slowly colonising the south of Scotland and this is reflected in the eight breeding pairs located in this region in 2007, an increase of two pairs over the previous year. However, the breeding success experienced was poor and only three pairs (38%) reared any young. The seven young that fledged give a low mean of 0.9 per monitored occupied nest site.

Dumfries & Galloway

Three pairs were again located in the spring but all three failed at an early stage or were possibly non-breeders. It is hoped that these disappointing events will prove only a minor set back to the colonisation of the southwest.

4.12 Common Kestrel *Falco tinnunculus*

The decline in the number of submitted nesting attempts noted in the 2006 report (42%) continued in 2007 with a further fall of 46% (Table 17). There are now fewer breeding pairs of kestrels being monitored than at the start of Scheme in 2003. However, it has been reported that for some years, this species has been in long-term decline (Eaton *et al.*, 2008), but the reasons are not fully understood. Furthermore, results from the long-running study in South Strathclyde showed 2007 to be a particularly poor one for home range occupation (Table 18). Overall, in 2007, checks were made at 90 kestrel home ranges and 52 were occupied. Monitoring visits were made to 39 pairs, 36 laid eggs and 35 succeeded in rearing at least 139 young. Mean brood size per monitored occupied home range was 3.6 young.

Orkney

Pairs were present at five home ranges and four laid eggs. Three of these pairs were successful and reared 12 young.

Highland

There were six occupied home ranges on the Isle of Eigg. Five of these were monitored and all succeeded in rearing young. The broods were difficult to count and only a minimum figure of eight young was reported. Similar monitoring effort occurred in Easter Ross and Inverness where a further five pairs were successful in fledging 22 young.

Argyll

Checks were carried out at 27 previous known nesting locations but just six (22%) were occupied. Three received further visits and two pairs reared 10 young.

Tayside

All eight home ranges checked were occupied and seven received further visits. All seven were successful, producing at least 22+ young.

South Strathclyde

In Ayrshire, 36 known breeding locations were again checked for occupancy in the spring. There were signs of occupancy at 20 (56%). Further visits were made to 13 home ranges and eggs were laid at 12 of them. They were very successful, producing 59 young. Mean brood size per monitored occupied home range was 4.5 young. Table 18 shows a summary of the last 5 years from this long running study. It demonstrates the value of this type of standard monitoring and the importance not only of productivity (number of young fledged per monitored occupied home range) but more importantly occupancy (the proportion of home ranges checked that held pairs).

Lothian & Borders

The Pentland Hills study ended after the 2006 season when the two field workers involved emigrated and in 2007 there was no one immediately available to take over this rewarding work and no monitoring was carried out.

Dumfries & Galloway

A single nest record was received for the region of a pair that reared six young.

4.13 Merlin *Falco columbarius*

The popularity amongst fieldworkers for studying this diminutive falcon remains high throughout Scotland and thousands of hours were expended during the breeding season checking 397 home ranges (Table 19). At 262 (66%) field signs such as ‘splash’, plucked prey remains and cast feathers were present and at 168 home ranges, further visits were carried out to locate nesting pairs. These repeat visits revealed 157 (93%) pairs had reached the egg laying stage, 143 (85%) hatched at least one egg and 128 (76%) were successful in fledging young. Mean brood size for the 403 young fledged was 2.4 per monitored occupied home range. These figures are all an improvement on 2006.

Shetland

Coverage in Shetland involved checking 37 home ranges for signs of occupation. Fifteen pairs were found and monitored. They achieved 100% breeding success and 51 young fledged. Mean brood size per monitored occupied home range was an excellent 3.4.

Orkney

Three islands were again checked and 21 occupied home ranges were found, the same number as in 2006. Eighteen pairs received follow up checks of which 14 (78%) laid eggs, 12 (67%) hatched young and 10 (56%) fledged at least one young. The 32 young fledged give a mean brood size of 1.8 per monitored occupied home range.

Uist

Excellent coverage again in the Uists and Barra revealed 26 occupied home ranges. A sample of 11 pairs was monitored. All 11 pairs were successful, rearing 37 young. Mean brood size per monitored occupied home range was 3.4.

Highland

In the northern counties of Sutherland and Ross-shire, 38 home ranges were checked. Signs of occupation by Merlin were present at 23 (61%). Ten were revisited and held breeding pairs of which nine bred successfully rearing 30 young. In the west, on the Inner Hebridean islands of Skye and Rum, checks were made at 16 known home ranges. Merlin signs were present at nine (56%). Five pairs received further coverage, four laid eggs, and three succeeded in rearing 14 young. Coverage was poor in Inverness and Strathspey. Four home ranges had signs of occupation but no monitoring checks were carried out. In west Moray and Nairn, 14 home ranges were checked, with just seven (50%) having signs of occupation. Breeding occurred at all seven but the failure rate at 71% was high and just two pairs were successful, rearing only four young – a very poor result. Overall, the mean brood size per monitored occupied home range in Highland was 2.2 young.

Northeast Scotland

A reduction in coverage averaging 20% across the four study areas in this region occurred in 2007. Seventy-six home ranges were checked and 43 (57%) had signs of occupation. Forty-two breeding pairs were monitored. Hatching occurred at 34 nests (81%) and 85 young fledged at 30 successful ones (71%). The mean brood size per monitored occupied home range was 2.0.

Tayside

A 30% decline in coverage occurred in the Perthshire study area, down from 57 home ranges checked in 2006 to 40 in the current year. This was partially offset by improved monitoring in Angus. Overall, 68 known home ranges were checked for occupancy in the spring. Merlin signs were present at 42 (62%) and follow-up visits occurred at 26 of those that held pairs. Twenty-one pairs laid eggs and they enjoyed 100% breeding success, rearing 61 young between them. Mean brood size was 2.3 young per monitored occupied home range.

Central Scotland

Six home ranges received visits and five showed some signs of occupation. Just a single breeding pair was followed, it nested successfully but the brood size was not counted.

Argyll

There were signs of occupation at six of the seven home ranges visited but only two breeding pairs were monitored. They reared broods of two and four young.

South Strathclyde

Greatly improved coverage in this region involved the checking of 21 historic home ranges and Merlin signs were present at 19 of them. Eleven pairs were monitored of which ten succeeded in rearing 33 young giving a mean brood size of 3.0 per monitored occupied home range.

Lothian & Borders

In the main study area based in the Lammermuir Hills, a poor year in terms of home range occupancy was experienced with just 13 (45%) of 29 visited showing signs of Merlin activity and pairs confirmed and monitored at only five home ranges (17%). Cool, wet weather and more intensive heather burning were all possible contributing factors. The four pairs that laid eggs all bred successfully, producing 16 young, a mean brood size per monitored occupied home range of 3.2.

Dumfries & Galloway

Five nesting pairs were monitored but only two (40%) bred successfully, fledging seven young.

4.14 Eurasian Hobby *Falco subbuteo*

The Hobby is primarily a scarce passage migrant seen annually in increasing numbers in Scotland. Breeding occasionally occurs and was annually recorded between 2003 and 2005 (Crooke, 2007) but there were no confirmed records in 2007.

4.15 Peregrine Falcon *Falco peregrinus*

The cosmopolitan Peregrine Falcon was last surveyed in 2002 when 592 pairs were found in Scotland (Banks *et al.* 2003, Hardey 2007), 42% of the UK population. Amateur fieldworkers currently monitor the breeding success of a large proportion of this population. In 2007, visits were made to 634 known home ranges (Table 20). Pairs were present at 338 (53%) and additional single birds at 47 (7%). Further visits were made to check the breeding progress of 302 pairs. At least 244 (81%) laid eggs with the remaining 58 failing at an early stage or possibly non-breeding. Two hundred and nine pairs (69%) reached the hatching stage and 198 (66%) fledged a minimum of one young. There were 449 young, a mean brood size of 1.5 young per monitored occupied home range. Tables 21a and 21b show the variations in home range occupancy and breeding success in response to land management and location. Thus coastal breeding Peregrines enjoy occupancy rates and breeding success double that of pairs attempting to nest on grouse-moor and nearly 20% greater than pairs occupying other inland habitats. This is in line with the findings of an earlier study (Hardey *et al.* 2003). Please refer to Section 3.7 above to see how we are developing the analysis of SRMS data.

Shetland

Two pairs bred at traditional sites. The outcome of one was unknown but the other successfully reared three young.

Orkney

Sixteen home ranges were again checked in the spring. Twelve pairs and three single birds were found in occupancy. Ten pairs received follow up checks. One failed early or was non-breeding. Of the nine pairs that were confirmed breeders, three failed during incubation. The six remaining pairs all succeeded in their nesting attempt, raising 11 young.

Uist

Pairs were present at all ten home ranges checked, five of which received monitoring visits. Of these, four were confirmed to lay eggs, hatch and raise young. A minimum of eight young fledged.

Highland

A small improvement in the number of home ranges checked for occupancy revealed 22 of 32 (69%) home ranges held pairs with two single birds present. The breeding performances of 17 pairs were monitored of which 15 were confirmed to lay eggs. There were only three failures, and 25 young fledged from the 12 (71%) successful nests. Mean brood size per monitored occupied home range was 1.5.

Northeast Scotland

A large sample of 97 home ranges was visited in the spring and examined for occupancy. Thirty-nine pairs and two single birds held territory. There appears to have been a downward trend in the occupancy of traditional home ranges in this region in recent years. In the period 2003-2005, occupancy by pairs held steady at 52-54% but in 2006 fell to 46% and fell further to 40% in 2007. Thirty-seven pairs were closely monitored. As many as 14 pairs (38%) either failed early or were non-breeding and three pairs (8%) failed during incubation. There were 20 successful pairs (54%) rearing a minimum of 38 young. Mean brood size was 1.0 per monitored occupied home range. The annual productivity in Northeast Scotland is consistently below the Scottish average for all regions.

Tayside & Fife

Ninety-six home ranges were visited at least once in the breeding season to check for occupancy. Peregrine pairs were recorded at 58 home ranges (60%) and single birds at six. Fifty-one received follow up checks. There were 37 (73%) successful breeding pairs rearing 84 young, providing a mean brood size of 1.6 young per monitored occupied home range. Of the 14 failures, nine were due to non-breeding or occurred early in the breeding cycle, and five occurred during the incubation/nestling period.

Perthshire and Fife, west of the A9 and M90

Checks were made at 31 home ranges and 23 (74%) held pairs; the breeding success of 22 pairs was monitored. Five pairs failed early or were non-breeders and another failed during incubation. The remaining 16 pairs (73%) produced 32 young, a mean brood size per monitored occupied home range of 1.5.

Perthshire and Fife, east of the A9 and M90

In this region, covering much of lowland Perthshire and Fife, 20 home ranges received occupancy checks. The breeding output of the 12 pairs found was closely monitored. Nine pairs succeeded in fledging 24 young, a mean of 2.0 young per monitored occupied home range.

Angus inland

On the eastern moors of Angus, 35 historic home ranges received occupancy checks. Pairs were present at 16 (46%) and the nesting success of ten of them was monitored. Five (50%) were successful rearing 13 young. The mean brood size was 1.3 young per monitored occupied home range. The poor breeding success and productivity, combined with the low rate of occupancy, is matched in other regions where driven grouse shooting dominates the management of upland areas (Tables 21a & 21b).

Angus coastal plain

Checks were made at ten home ranges along the coastal plain, revealing Peregrine pairs at seven (70%). All seven bred successfully rearing 15 young. Mean brood size per monitored occupied home range was 2.1.

Central Scotland

Thirty-five home ranges in Central Scotland received checks and 22 (63%) held pairs. Breeding success was high with 18 (86%) of the 21 home ranges monitored producing fledged young. The 38 young counted give a mean brood size of 1.8 per monitored occupied home range.

Argyll

Mainland

Checks were carried out at 21 home ranges on the mainland. Pairs were present at 13 (62%) and the breeding success of 11 pairs was monitored. This was poor with just five pairs (45%) rearing 13 young, giving a mean brood size of 1.2 per monitored occupied home range.

Islands (Bute, Coll, Colonsay, Islay & Tiree)

Eight out of nine home ranges checked held pairs of Peregrines, of which seven were monitored. Four (57%) of these pairs bred successfully rearing five young but two broods could not be counted.

South Strathclyde

Inland

Checks were carried out at 42 inland home ranges and pairs occupied 22 (52%) of these. In addition, there were six home ranges with single adults in attendance. Twenty-one pairs received monitoring visits. There were nine breeding failures and the evidence at four showed this was due to persecution. The 12 pairs (57%) that were successful in their breeding attempt had a mean brood size of 1.4 per monitored occupied home range.

Coast

At coastal sites in the region, 11 home ranges were visited and nine pairs (82%) were located. Eight of these were monitored of which six (75%) produced 18 young. Mean brood size for this small sample was 2.3 young per monitored occupied home range.

Isle of Arran

Four home ranges were checked, three pairs were present, two were monitored and both bred successfully, each rearing a single chick.

Lothian & Borders

An impressive number of home ranges is now being checked each spring as part of a long running cooperative study between Natural Research and the Scottish Raptor Study Groups into the demography and recruitment of Peregrines breeding across southern Scotland and in northern England (www.natural-research.org/projects.htm). This study is spread mainly across the regions covered by the South Strathclyde, Dumfries & Galloway and Lothian & Borders Raptor Study Groups, but primarily the latter where 145 home ranges were visited across five major land use categories. Fifty-eight pairs (40%) and 11 single birds (8%) were located. All 58 pairs were monitored of which 44 pairs were confirmed to lay eggs and 14 pairs failed early or were non-breeding. A further 15 pairs failed at a later stage and 29 pairs (50% of pairs monitored) succeeded in rearing 75 young. Mean brood size per monitored occupied home range was 1.3 young.

Grouse-moor

Visits were made to 27 known home ranges on moorland managed for grouse shooting. Eight pairs (30%) were found and monitored but five of these (62%) failed at some stage during the breeding cycle. The three pairs (38%) left did well in rearing nine young, boosting the mean brood size per monitored occupied home range to 1.1.

Other upland areas

Although home range occupancy was higher in other upland areas, breeding success and productivity were no better than the neighbouring grouse-moors. Checks were made at 34

home ranges with pairs occurring at 16 (47%) and single birds at four. Only six pairs (38%) bred successfully, fledging 16 young. Mean brood size was 1.0 young per monitored occupied home range.

Lowland farmland
Twenty-two lowland home ranges were visited and 16 pairs (73%) and two single birds were present. Seven pairs failed through various causes. Nine successful pairs (56%) fledged 22 young. Mean brood size per monitored occupied home range was 1.4 young. These figures are similar to those from 2006.

Urban/industrial
Man-made breeding sites are being increasingly used by Peregrines in Scotland either due to the abundance of prey species present e.g. feral Rock Pigeons in towns or because of the lack of suitable natural sites in an otherwise productive area. Eleven such home ranges were checked in 2007 and 10 were occupied. Eight (73%) held potential breeding pairs and two single birds were present. Of the pairs, three failed prior to chicks fledging but five (63%) produced 14 young. Mean brood was 1.8 young per monitored occupied home range.

Coast
There was a large increase in the number of coastal home ranges checked in the spring, up from 25 in 2006 to 51 in the present year. Many of these historic sites have probably not been occupied for years if not decades and only ten pairs (20%) and a single bird was located. Four of the pairs failed but the remaining six pairs (60%) produced 14 young, giving a mean brood size per monitored occupied home range of 1.4.

Dumfries & Galloway

Monitoring effort in the region was maintained at a high level with 113 home ranges receiving at least one visit during the spring. Occupation was recorded for 60 pairs (53%) and 10 single birds. Fifty-three pairs received further visits of which 42 were recorded breeding successfully, fledging 99 young. Mean brood size per monitored occupied home range was an impressive 1.9 young, the highest for the year in any study region in Scotland.

Wigtown & Kirkcudbright coast
In this southwest corner of Scotland, checks were carried out at 34 coastal home ranges. Twenty-three pairs (68%) and four single birds were located. Regular visits were made to 17 pairs to monitor their breeding attempts. There was just three failures, 14 pairs (82%) fledged 30 young. Mean brood size per monitored occupied home range was 1.8 young.

Moffat & Eskdale
Twenty inland home ranges were checked (the same number as 2006) and 12 pairs (60%) and four single birds were present. Ten pairs (83%) bred successfully rearing an impressive 30 young. Mean brood size per monitored occupied home range was 2.5 young.

Nithsdale
The habitat in this area is dominated by heather moorland managed for grouse shooting. Twenty-six home ranges received spring checks and only nine (35%) held pairs. Eight were monitored, of which five (63%) bred successfully, fledging 12 young. Mean brood size per monitored occupied home range was 1.5.

Galloway inland
Thirty-three home ranges were checked and 16 (48%) held pairs, the same as the previous year. There were only three failures with 13 pairs fledging 27 young. Mean brood size per monitored occupied home range was 1.7 young.

4.16 Barn Owl *Tyto alba*

In Scotland, the Barn Owl is most abundant in Dumfries & Galloway, Ayrshire, Argyll and Lothian & Borders, with an important population in the coastal plain around the inner Moray Firth (Shaw 2007). The recent run of mild winters has greatly benefited this species, which is susceptible to prolonged frosts and snow cover. In some regions, the loss or absence of nesting sites in derelict buildings and old hollow trees may be an important limiting factor (Taylor & Walton 2003). An important initiative in addressing the lack of nest sites in otherwise suitable breeding habitat is through the adequate provision of nest boxes. Nest box schemes are now the corner stone for all studies of this attractive owl and are an essential long-term conservation tool in Scotland (Shaw 2007). Over the past five years studies involving nest boxes have led to a trend of increased and improved reporting. In 2007, there was a 29% increase in the number of nesting locations[1] checked and a 40% increase in the number of pairs monitored over the previous year. For 2003, the figures are 82% and 57% respectively. Table 22 shows that visits were made to 474 known nesting locations of which 391 (82%) held pairs and 21 (4%) held single birds. Of the 374 pairs monitored, 352 (94%) were confirmed to lay eggs. Of these, 332 (94% of laying birds) reached hatching and 320 (91%) fledged at least one young. The number of young reared (1,032) gives a mean brood per monitored pair of 2.8 young and 3.2 per successful pair, greatly improved figures over the previous year.

Highland
The expansion in range continued in 2007, with new pairs found further north and west including a single breeding pair on the Isle of Eigg. Pairs were found at 38 (86%) of 44 nesting locations checked. Of the 36 pairs monitored, 34 (94%) laid eggs, 33 (92%) hatched young and 30 (83%) succeeded in fledging 89 young. Mean brood size was 2.5 young per monitored pair.

Northeast Scotland
Thirty-three nesting locations were checked and Barn Owls were present at 32 (97%); 25 (76%) with pairs and single birds at another seven (21%). A sample of 19 received further checks, but just ten clutches of eggs were confirmed. However, they were all successful; the 30 young produced giving a mean brood size per monitored pair of 1.6.

Tayside
Eleven pairs were found, three in Perthshire and eight in Fife. Nine pairs received further checks and all of them bred successfully, rearing 29 young. This excellent result gives a mean brood size per monitored pair of 3.2 young.

Central Scotland
Barn Owls enjoyed a very good breeding season with pairs present at all locations checked. In a Stirlingshire forest study, 36 pairs were present and laid eggs. Success was high with 33 pairs (92%) hatching and rearing 114 young, a mean brood size per monitored pair of 3.2 young.

[1] The focus of attention when monitoring this species is the known nesting location (a nest box, farm building or hollow tree) rather than a territory.

Three of these pairs laid second clutches and went on to fledge 11 young in the autumn. In summary, the 36 pairs reared 125 young in 39 breeding attempts. Elsewhere, in another Stirlingshire study, 22 pairs were monitored from which 21 laid clutches of eggs and 20 fledged 63 young. Finally, in Clackmannanshire, four pairs reared 15 young. Combined, there were 65 breeding attempts and 60 (92%) were successful. The number of young fledged was 203, giving a mean brood size of 3.3 young per monitored pair including the second broods.

Argyll

Four pairs each were found on Mull and Islay. Six bred successfully, rearing 14 young. Elsewhere, 15 breeding pairs were monitored on the Cowal peninsula and the nearby island of Bute, eleven of which produced 35 young. Overall, for the region, the mean brood size was 2.2 young per monitored pair.

South Strathclyde

Seven nesting pairs were monitored on the Isle of Arran and six on the mainland. All seven on Arran were successful and reared 15 young. On the mainland, five succeeded and at least nine young fledged but two broods could not be counted so were estimated at one each.

Lothian & Borders

As part of an extensive study, 44 nesting locations were checked and 43 pairs were found. Forty of these received follow-up checks. There were just two failures; 38 pairs reared a minimum 115 young. Mean brood size per monitored pair was 2.9 young. One of the failed pairs re-laid and reared four young. Furthermore, four of the successful pairs laid a second clutch and from two of these an additional three young were reared. Combining them all, the 40 pairs therefore raised 122 young.

Dumfries & Galloway

Barn Owls occur at high densities throughout the region, aided by a number of nest box schemes.

Wigtown & Galloway Forest

Sixty boxes were checked and pairs of owls were present in 45 (75%). Forty-three pairs laid clutches and 41 (95%) reached the hatching stage. There were 37 (86%) successful pairs, rearing 126 young. Mean brood size per monitored pair at 2.8 was the same as 2006.

West Wigtownshire

Ninety-nine nesting locations were checked for occupation and pairs were present at 72 (73%) of them. Seventy-one pairs were revisited and 63 (89%) were confirmed to lay eggs. Fifty-eight pairs hatched young and 57 were successful. They raised 189 young, a mean brood size of 2.7 young per monitored pair.

Kirkcudbrightshire & Dumfries

An increase in data submitted resulted in a near doubling of the records of pairs with nest histories for this area. Sixty-seven nesting locations were checked. Pairs were present at 49 (73%) and all laid clutches of eggs. With just two breeding failures, fledging success was again high at 96% (96% in 2006). However, brood sizes were much larger in 2007; the 171 fledged young gave a mean brood size per monitored pair of 3.5 (2.5 in 2006).

4.17 Little Owl *Athene noctua*

Confirmed breeding in Scotland first occurred in the Borders in 1958, but breeding records since have not occurred annually nor have they ever exceeded three in any one year, the last being in Dumfries & Galloway in 1993 (Gordon 2007). Sightings of individuals since have been scarce but suggest a very small breeding population may still be present. The two records in 2007, both in Lothian & Borders, lend support to this theory with a calling bird reported in early June and a dead bird found on a road in early August.

4.18 Tawny Owl *Strix aluco*

As with the Barn Owl, most reported nest locations are in boxes, which greatly facilitates monitoring. One hundred and fifty-seven known nesting locations were checked in the spring of 2007 (Table 23), only slightly down on the 2006 figure of 168. Birds were present in 109 (69%) nest boxes and 103 of these received further visits. Tawny Owl pairs were confirmed to lay eggs in 101 boxes of which 78 (77%) gave rise to 142 young. Mean brood size was 1.4 young per monitored occupied box. This breeding success and productivity is similar to 2006 (72% and 1.4 young).

Highland

2007 was an improved breeding season compared to the poor year experienced by this species in Highland in 2006. Checks were made at 75 boxes and 47 (63%) held pairs, all of which laid eggs. There were just seven breeding failures and 40 pairs (85%) raised 77 young. Mean brood size per monitored occupied nest box was 1.6 young.

Tayside

Two nests were monitored, both were successful, each producing two young.

Argyll

Thirty-one of 34 boxes checked were part of a study of the species by Forestry Commission staff mainly in commercial woodland on the Cowal peninsula. All were occupied and 30 were closely monitored. Fifteen pairs (50%) bred successfully, rearing 22 young. Six, possibly seven, of the 15 failures were attributed to Pine Martens taking over the box during incubation but it was not known whether adult birds were additionally lost at the time. Mean brood size was a poor 0.7 young per monitored occupied nest box. Elsewhere in the region, on the islands of Bute and Islay, three boxes were checked, two were occupied and one reared two chicks.

Lothian & Borders

Only 12 nest boxes of 30 checked (40%) were occupied in this region, all sited in Forestry Commission woodland. There were no failures and 23 young were counted.

Dumfries & Galloway

Of 16 boxes checked, 15 had signs of occupation. Ten with eggs were followed up and eight (80%) were successful rearing 14 young.

4.19 Long-eared Owl *Asio otus*

The numbers of nesting pairs located in 2007 was low, and no region submitted more than a few breeding records. Searches were carried out at 30 known breeding territories and 20 (67%) were occupied (Table 24). Seventeen active nests were found, many at the chick stage. There were no failures and a minimum of 38 fledged young was recorded. The total included three nesting pairs each on Colonsay and Eigg, with both these west coast islands producing six young.

4.20 Short-eared Owl *Asio flammeus*

Short-eared Owls are perhaps one of the most difficult upland breeding birds to monitor. Estimates of the breeding population are considered unreliable and trends over time are unknown. A recent study highlighted the problems associated with surveying this species (Calladine *et al.* 2008). The main findings were owls were only visible during daylight hours for less than 5% of the time during the breeding season, with mornings during the incubation period and both mornings and evenings during the chick rearing period being the most reliable times for detection. These problems are compounded by the fact that the timing and numbers of Short-eared Owls breeding can vary, probably in relation to vole abundance. In 2007, for the second year running, the species was widespread and abundant on Orkney and sightings of adults from suitable moorland breeding habitat elsewhere in Scotland, particularly Tayside, suggest high vole numbers were maintained in some regions. There was an increase in the number of nests found and monitored in 2007 over the previous year, as was the number of fledged young reported. Overall, 76 pairs and occupied nest sites were located and an additional 22 apparently single birds recorded (Table 25). Seventeen successful nests were checked and 42 young were counted. The mean brood size was 2.5 per monitored nest for a species where counting the number of fledged young can be notoriously difficult.

Orkney
Forty-nine pairs or occupied nests sites were recorded on Orkney moors, but just one nest was located and monitored, rearing a single chick.

Uist
A single nest with four young was found.

Highland
Three nests were located and a minimum of six young fledged.

Tayside
Breeding was probably widespread in the region with pairs present at eight locations and additional single birds recorded on 12 occasions. The five nests found raised a minimum of 14 young.

Central Scotland
Four pairs were reported but just one nest with a single chick was found.

Argyll
Two possible breeding pairs were reported but no nests were found.

South Strathclyde
Two successful nests were reported, one with a brood of six and the other with at least one fledged young.

Lothian & Borders
Four nests were monitored and produced a minimum of nine young.

4.21 Common Raven *Corvus corax*

In Britain, the remarkable spread eastwards of the Common Raven (hereafter Raven) over the past 20 years, from its traditional heartland in the mountainous and upland areas of the north and west, matches closely that of the Common Buzzard and may have a common root cause. Tree and quarry nesting Ravens are now returning to lowland habitats in east Scotland where they have been absent or very scarce for nearly 200 years (Ratcliffe 1997). There are exceptions, notably Northeast Scotland and some of the eastern fringes of Highland, where Ravens are absent as a breeding species from both upland and lowland locations. However, the number of occupied home ranges reported to the SRMS continues to increase each year. Annual totals are 168 in 2003; 208 in 2004; 257 in 2005; 324 in 2006 and 352 in 2007. This apparent 110 percent increase is not solely due to population growth as there is both an increasing awareness and increased reporting by fieldworkers. In 2007, visits were made to 408 known home ranges and 352 (86%) were occupied (Table 26). The breeding attempts of 299 pairs were monitored. Non-breeding or a failure during the early stages affected 38 pairs (13%). Of the remaining 261 pairs that laid eggs, 20 (8%) failed during incubation but only four (1.5%) failed with young. There were 237 successful nests (79% of monitored pairs), but at 42 of these nests the brood was not counted. The mean brood size at nests where the young were counted was 3.0. This figure indicates the number of young reared would be in the region of 720 rather than the minimum estimated count of 636.

Orkney
Fifty-three breeding pairs were monitored. There were 36 successful nests (68%) with 99 young counted. Mean brood size was 1.9 young per monitored occupied home range.

Uist
Pairs were present at all 15 home ranges visited. Eleven pairs were monitored. There were no failures. The 33 young fledged give a mean brood size of 3.0 per monitored occupied home range.

Highland
Checks were carried out at nine mainland home ranges, eight of which held breeding pairs. There were no failures and 29 young fledged successfully. Mean brood size per monitored pair was 3.6 young. On the island of Eigg, five home ranges were checked and each held a breeding pair. Four were successful, rearing 14 young. Mean brood size was 2.8 per monitored occupied home range.

Tayside
Angus & Fife
Twenty known home ranges received visits in the spring and pairs were present at 15 (75%). Eleven were subsequently monitored. Compared with elsewhere, breeding success was poor with just six pairs (55%) producing 21 fledged young. Mean brood size per monitored

occupied home range was 1.9 young. Eight of the nests were on grouse-moors in Angus, but just four succeeded and human intervention was implicated in two of the failures.

Perth & Kinross
Further west in the region, 56 home ranges were checked for occupation and 53 (95%) held Raven pairs. Monitoring visits were carried out on 44 pairs. Thirty-five pairs (80%) were known to be successful, rearing 94 fledged young. Mean brood size was 2.1 young per monitored occupied home range, the same figure as in 2006.

Central Scotland

Checks were carried out at 41 home ranges and 39 pairs were present. Follow up visits were made on 34 pairs. Six pairs either failed early or were not breeding. There was only one more failure (occurring during incubation) and 27 pairs (79%) reared a minimum of 58 young. Mean brood size per monitored occupied home range was 1.7.

Argyll

Colonsay, Islay and Tiree
Twenty-seven of 29 home ranges checked held Raven pairs. Nineteen were monitored further. There were five pre-lay/early failures (26%) but all 14 of the remaining pairs (74%) succeeded in rearing young. The 52 young that fledged give a mean brood size per monitored occupied home range of 2.7.

Cowal peninsula and the Isle of Bute
Visits were made to 64 home ranges in the early spring and 44 (69%) were occupied. This proportion is much lower than samples checked elsewhere in the north and west. Thirty-seven received further visits, of which 31 (84%) reared a minimum of 61 young. Mean brood size per monitored occupied home range was 1.6.

South Strathclyde

Inland
Pairs were present at 24 of the 29 (83%) inland home ranges that received spring checks. The breeding attempts of 18 pairs were monitored. Four failed early or were non-breeding (22%) but the remaining 14 (78%) succeeded in rearing 37 young. This gives a mean brood size of 2.1 per monitored occupied home range.

Coastal
Nine pairs of breeding Ravens were present at the 11 home ranges checked. There were no failures and 22 young fledged successfully.

Lothian & Borders

Inland
Of the 35 home ranges visited, 29 (83%) held pairs from which 27 received further monitoring visits. Four pairs failed at an early stage. The remaining 23 (85%) all bred successfully, rearing 68 young, giving a mean brood size per monitored occupied home range of 2.5.

Coastal
Raven coastal home ranges in the southeast apparently have a lower occupation rate than anywhere else in Scotland, but this should change as the species consolidates its spread into eastern and lowland Britain. There were seven pairs (54%) present in the 13 home ranges

checked and two of these failed at an early stage or were non-breeders. The five remaining pairs were all successful, rearing 11 young.

Dumfries & Galloway

From the 28 home ranges that received initial visits, 24 (86%) held Raven pairs. Sixteen received further checks, from which 14 (88%) were successful in rearing young. The 37 fledged young counted give a mean brood size per monitored occupied home range of 2.3.

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The Scottish Raptor Monitoring Officer welcomes all raptor, owl and Common Raven breeding records and can be contacted at the following address: Brian Etheridge, c/o RSPB North Scotland Office, Etive House, Beechwood Park, Inverness, IV2 3BW. brian.etheridge@rspb.org.uk

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7 Species Tables

Table 5: Population growth & breeding success of Red Kites in Scotland, 1992-2007.

Year*	Pairs laying eggs	Pairs fledging young	Total young fledged	% of pairs laying that fledged young	Productivity: young/laying pair
1992 [1]	**1**	**1**	**1**	**100**	**1**
1993	5	3	7	60	1.4
1994	8	7	13	87	1.6
1995	15	11	26	73	1.7
1996	17	16	39	94	2.3
1997	23	19	39	83	1.7
1998 [2]	**25**	**22**	**49**	**88**	**2**
1999	34	27	59	79	1.7
2000	39	35	86	90	2.2
2001	43	38	95	88	2.2
2002	50	43	112	86	2.2
2003 [3]	**54**	**48**	**106**	**84**	**1.9**
2004	60	49	115	82	2.1
2005	76	61	131	80	1.7
2006	84	69	151	82	1.8
2007	93	73	162	78	1.7
TOTAL	**627**	**522**	**1191**	**83**	**1.9**

1992 [1] Breeding in North Scotland commences
1998 [2] Breeding in Central Scotland commences
2003 [3] Breeding in Dumfries & Galloway commences
* some totals published in earlier reports have been corrected

Table 6: Breeding success of Red Kites in Scotland, 2007.

Region	Home ranges checked[1]	Pairs located	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Highland	74	41	40	1	39	30	28	65
Tayside	29	20	16	3	13	11	11	24
Central Scotland	43	26	25	5	20	18	15	35
Dumfries & Galloway	[22]	22	22	1	21	19	19	38
TOTAL	**168**	**109**	**103**	**10**	**93**	**78**	**73**	**162**

[1] In this and subsequent tables, square brackets denote that an accurate figure for the number of home ranges checked was not provided and a minimum figure based on the number of pairs located has been used instead.

Table 7: Breeding success of White-tailed Eagles in Scotland, 2007.

Study area	Pairs monitored	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young
Isle of Skye	11	9	7	4	5
Argyll islands	11	9	7	7	10
Western Isles	10	8	8	8	13
NW Mainland & Small Isles	10	9	9	5	6
TOTAL	**42**	**35**	**31**	**24**	**34**

Table 8: White-tailed Eagle breeding success and productivity in Scotland, 1996-2007 (from Crawford *et al*. 2008).

Year	Territorial pairs	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Total young fledged	Young fledged per pair laying	Young fledged per territorial pair
1996	12	12	8	7	9	0.75	0.75
1997	14	11	6	5	9	0.64	0.64
1998	19	16	9	9	13	0.81	0.68
1999	20	16	9	6	11	0.69	0.55
2000	22	19	12	8	12	0.63	0.55
2001	23	17	10	7	11	0.65	0.48
2002	25	22	14	8	12	0.55	0.48
2003	31	25	20	16	26	1.04	0.84
2004	32	28	19	15	19	0.68	0.59
2005	33	28	21	17	24	0.86	0.73
2006	36	31	25	21	29	0.94	0.81
2007	42	35	31	24	34	0.97	0.81

Table 9: Breeding success of Eurasian Marsh Harriers in Scotland, 2007.

Region	Pairs located	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Orkney	1	[1]	0	0
Tayside	7	4	2	3
Total	**8**	**[5]**	**2**	**3**

Table 10: Breeding success of Hen Harriers in Scotland, 2007.

Area	Home ranges checked	Home ranges occupied by pairs	Occupied home ranges monitored	Failed early or non-breeding	Pairs known to lay eggs	Pairs known to hatch eggs	Pairs known to fledge young	Minimum number of young fledged
Orkney	**65**	**64**	**64**	**21**	**43**	**26**	**25**	**75**
Hebrides								
- North Uist	22	22	14	-	14	11	11	33
- Benbecula	9	9	6	-	6	6	6	16
- South Uist	13	13	9	-	9	6	6	17
- Skye and Eigg	23	13	12	-	12	12	6	20
sub-total	**67**	**57**	**41**	**-**	**41**	**35**	**29**	**86**
North Highlands								
- Sutherland	15	9	7	-	7	5	4	13
- Ross-shire & Inverness	7	5	2	1	1	1	1	4
sub-total	**22**	**14**	**9**	**1**	**8**	**6**	**5**	**17**
East Highlands								
- Moray & Nairn	14	6	6	-	6	6	6	12
- Aberdeenshire	5	5	5	2	3	2	2	3
- Angus	15	0	-	-	-	-	-	-
- Perthshire	44	37	28	3	25	24	24	79
sub-total	**78**	**48**	**39**	**5**	**34**	**32**	**32**	**94**
West Highlands and islands								
- Central	13	2	0	-	-	-	-	-
- Argyll mainland	13	9	4	2	2	2	1	2
- Mull & Coll	40	19	17	-	17	17	17	36
- Cowal & Bute	11	8	8	2	6	5	3	12
- Islay & Colonsay	9	9	7	-	7	6	4	13
- Arran	24	24	24	1	23	16	16	41
sub-total	**110**	**71**	**60**	**5**	**55**	**46**	**41**	**104**
Southwest and Southern Uplands								
- South Strathclyde	54	27	24	4	20	12	8	32
- Lothian & Borders	6	6	5	1	4	3	3	13
- Dumfries & Galloway	13	11	11	3	8	8	4	11
sub-total	**73**	**44**	**40**	**8**	**32**	**23**	**15**	**56**
TOTAL	**415**	**298**	**253**	**40**	**213**	**168**	**147**	**432**

Table 11: Home range occupancy and breeding success of Hen Harriers in Scotland, 2003-2007.

	2003	2004	2005	2006	2007
Home ranges checked	379	457	395	428	415
Home ranges occupied (%)	335 (88%)	417 (91%)	342 (87%)	355 (83%)	298 (72%)
Occupied home ranges monitored	303	359	310	278	253
Nests found with eggs (%)	271 (89%)	326 (91%)	268 (86%)	223 (80%)	213 (84%)
Nests fledging young (%)	171 (63%)	219 (67%)	175 (65%)	144 (65%)	147 (69%)
Minimum number of young fledged	529	630	466	381	432
Mean brood size	3.1	2.9	2.7	2.6	2.9
Mean brood size per laying pair	2.0	1.9	1.7	1.5	2.0
Mean brood size per monitored occupied home range	1.7	1.8	1.5	1.4	1.7

Table 12: Breeding success of Northern Goshawk in Scotland, 2007.

Region	Home ranges checked	Home ranges occupied	Occupied home ranges monitored	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Highland	3	1	-	-	-	-	-
Northeast Scotland	38	24	24	23	[17]	17	32
Tayside	1	1	1	1	1	1	3
South Strathclyde	4	4	-	-	-	-	-
Lothian & Borders	59	40	31	30	27	27	62
Dumfries & Galloway	31	17	17	16	15	15	30
TOTAL	**136**	**87**	**73**	**70**	**60**	**60**	**127**

Table 13: Breeding success of Eurasian Sparrowhawks in Scotland, 2007.

Region	Home ranges checked	Home ranges occupied	Occupied home ranges monitored	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Orkney	14	8	6	3	3	1	3
Uist	4	3	1	1	1	1	2
Highland	[2]	2	2	2	2	2	9
Tayside	[3]	3	3	3	3	3	7
Argyll	22	12	5	5	5	5	11
South Strathclyde	57	37	36	36	29	28	97
Dumfries & Galloway	[2]	2	2	2	2	2	6
Total	**[104]**	**67**	**55**	**52**	**45**	**42**	**135**

Table 14: Breeding success of Common Buzzards in Scotland, 2007.

Region	Home ranges checked	Home ranges occupied by pairs	Home ranges monitored	Failed early or non-breeding	Pairs reported laying eggs	Pairs hatching young	Pairs reported fledging young	Min. no. of young fledged
Orkney	**6**	**2**	**2**	**1**	**1**	**1**	**1**	**1**
Uist	**[29]**	**29**	**8**	-	**8**	**8**	**7**	**14**
Highland								
- Eigg	6	6	6	1	5	5	5	11
- Caithness & Sutherland	[29]	29	28	3	25	21	20	41
- Ross-shire	70	65	63	6	57	45	44	78
- Inverness, - Badenoch & Moray	[16]	16	15	-	15	15	14	31
sub-total	**[121]**	**116**	**112**	**10**	**102**	**86**	**83**	**161**
Northeast Scotland	**136**	**89**	**28**	**-**	**28**	**23**	**23**	**36**
Tayside & Fife	**13**	**13**	**13**	-	**13**	**13**	**11**	**19**
Central Scotland	**158**	**139**	**112**	**6**	**106**	**94**	**93**	**170**
Argyll								
- Cowal peninsula	23	23	23	15	8	8	8	15
- Colonsay	58	23	20	14	6	6	6	12
- Islay	5	5	5	2	3	1	1	1
- Bute	49	38	36	2	34	33	31	59
sub-total	**135**	**89**	**84**	**33**	**51**	**48**	**46**	**87**
Dumfries & Galloway	**9**	**9**	**9**	-	**9**	**9**	**8**	**17**
Lothian & Borders								
- Lothian	25	25	25	-	25	21	19	40
- Borders	20	17	17	-	17	16	16	45
sub-total	**45**	**42**	**42**	**-**	**42**	**37**	**35**	**85**
TOTAL	**652**	**528**	**410**	**50**	**360**	**319**	**307**	**590**

Table 15: Breeding success of Golden Eagles in Scotland, 2007.

Region	Home ranges checked	Home ranges occupied by pairs[1]	Additional home ranges occupied[2]	Pairs monitored	Failed early or non-breeding	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Lewis & Harris	**4**	**3**	**-**	**3**	**1**	**2**	**2**	**2**	**2**
Uist	**26**	**25 (1)**	**1**	**23**	**5**	**18**	**14**	**10**	**11**
Highland									
- Sutherland	14	10	2	8	2	6	6	5	7
- Ross-shire	10	6	-	5	-	5	3	3	3
- Skye	34	29	-	29	11	18	8	8	9
- Rum, Canna & Eigg	6	6 (1)	-	6	1	5	3	3	3
- West Inverness-shire	19	12 (1)	1	12	5	7	5	4	4
- Ardnamurchan, Morvern & Sunart	23	19 (1)	3	19	9	10	4	2	2
- East Inverness-shire	8	3 (1)	2	2	2	-	-	-	-
- Badenoch	10	7 (1)	2	7	1	6	5	5	7
sub-total	**124**	**92 (5)**	**10**	**88**	**31**	**57**	**34**	**30**	**35**
Northeast Scotland	**20**	**15 (3)**	**3**	**14**	**7**	**7**	**4**	**4**	**5**
Tayside									
- Perthshire west of A9 road	*15*	*9 (1)*	*1*	*9*	*3*	*6*	*6*	*6*	*9*
- Perthshire east of A9 road	*5*	*4*	*4*	*4*	*-*	*4*	*4*	*3*	*3*
- Angus glens	*9*	*5*	*1*	*4*	*2*	*2*	*2*	*2*	*3*
sub-total	**29**	**18 (1)**	**6**	**17**	**5**	**12**	**12**	**11**	**15**
Central Scotland	**8**	**8**	**-**	**6**	**1**	**5**	**5**	**4**	**4**
Argyll & Arran									
- Islay & Colonsay	7	7 (1)	-	7	-	7	7	6	6
- Mull & Jura	35	27	3	26	11	15	10	9	9
- Mainland incl. Bute	28	23 (1)	3	23	2	21	13	11	12
- Arran	5	5	-	5	-	5	3	3	3
sub-total	**75**	**62 (2)**	**6**	**61**	**13**	**48**	**33**	**29**	**30**
Lothian & Borders	**3**	**2**	**-**	**2**	**-**	**2**	**1**	**1**	**1**
Dumfries & Galloway	**2**	**2**	**-**	**2**	**1**	**1**	**1**	**1**	**1**
TOTAL	**291**	**227(12)**	**26**	**216**	**64**	**152**	**106**	**92**	**104**

[1] including pairs where one or both birds are immature, shown in parentheses.
[2] by single birds or showing signs of occupation but no pair seen.

Table 16: Breeding success of Ospreys in Scotland, 2007.

Region	Nest sites checked	Pairs present	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Highland	106	67	65	9	56	[41]	41	79
North-east	33	19	19	3	16	13	12	22
Tayside	13	13	13	1	12	12	12	20
Central Scotland	22	18	18	2	16	14	13	32
Argyll	13	12	12	-	12	11	11	22
Lothian & Borders	8	8	8	1	7	4	3	7
Dumfries & Galloway	3	3	3	3	-	-	-	-
TOTAL	**198**	**140**	**138**	**19**	**119**	**95**	**92**	**182**

Table 17: Breeding success of Common Kestrels in Scotland, 2007.

Region	Home ranges checked	Home ranges occupied	Home ranges monitored	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Orkney	6	5	5	4	3	3	12
Highland							
- Isle of Eigg	6	6	5	5	5	5	8+
- Easter Ross/Inverness	6	6	5	5	5	5	22+
Tayside	8	8	7	7	7	7	22+
Argyll	27	6	3	2	2	2	10
South Strathclyde	36	20	13	12	12	12	59
Dumfries & Galloway	1	1	1	1	1	1	6
TOTAL	**90**	**52**	**39**	**36**	**35**	**35**	**139+**

Table 18: Breeding success of Common Kestrels in Ayrshire, 2003-07.

	2003	2004	2005	2006	2007
Home ranges checked	30	33	38	36	36
Number occupied (%)	20 (67%)	28 (85%)	20 (53%)	24 (67%)	20 (56%)
Home ranges monitored	20	26	17	24	13
Pairs laying eggs	17	24	14	21	12
Pairs hatching young	16	23	11	20	12
Pairs fledging young	16	23	11	20	12
Number of young	62	109	45	77	59
Mean brood size per monitored home range	3.1	4.2	2.6	3.2	4.5

Table 19: Breeding success of Merlin in Scotland, 2007.

Region	Home ranges checked	Home ranges with signs of occupation	Pairs monitored	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Shetland	**37**	**15**	**15**	**15**	**15**	**15**	**51**
Orkney							
- Mainland	12	12	12	8	7	5	20
- Hoy	7	7	4	4	3	3	5
- Rousay	2	2	2	2	2	2	7
sub-total	**21**	**21**	**18**	**14**	**12**	**10**	**32**
Uist							
- North Uist	9	9	4	4	4	4	13
- Benbecula	3	3	1	1	1	1	4
- South Uist	12	12	4	4	4	4	13
- Barra	2	2	2	2	2	2	7
sub-total	**26**	**26**	**11**	**11**	**11**	**11**	**37**
Highland							
- Skye & Rum	16	9	5	4	3	3	14
- Ross-shire/Sutherland	38	23	10	10	9	9	30
- Inverness/Strathspey	5	4	-	-	-	-	-
- West Moray/Nairn	14	7	7	7	6	2	4
sub-total	**73**	**43**	**22**	**21**	**18**	**14**	**48**
Northeast Scotland							
- East Moray	16	9	9	9	7	5	7
- Lower Deeside	16	7	7	7	6	5	17
- Mid/Upper Deeside	28	17	16	16	13	12	39
- Donside	16	10	10	10	8	8	22
sub-total	**76**	**43**	**42**	**42**	**34**	**30**	**85**
Tayside							
- Perthshire	40	25	11	9	9	9	22
- Angus	28	17	15	12	12	12	39
sub-total	**68**	**42**	**26**	**21**	**21**	**21**	**61**
Central Scotland	**6**	**5**	**1**	**1**	**1**	**1**	**1+**
Argyll	**7**	**6**	**2**	**2**	**2**	**2**	**6**
South Strathclyde	**21**	**19**	**11**	**11**	**11**	**10**	**33**
Lothian & Borders							
- Pentland Hills	6	6	2	2	2	2	5
- south of Peebles	8	8	5	5	5	4	14
- Moorfoot Hills	12	8	3	3	3	2	7
- Lammermuir Hills	29	13	5	4	4	4	16
sub-total	**55**	**35**	**15**	**14**	**14**	**12**	**42**
Dumfries & Galloway	**7**	**7**	**5**	**5**	**4**	**2**	**7**
TOTAL	**397**	**262**	**168**	**157**	**143**	**128**	**403**

Table 20: Breeding success of Peregrine Falcons in Scotland, 2007.

Region	Home ranges checked	Home ranges occupied by pairs	Home ranges occupied by single birds	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Shetland	**2**	**2**	**-**	**1**	**-**	**1**	**1**	**1**	**3**
Orkney	**16**	**12**	**3**	**10**	**1**	**9**	**6**	**6**	**11**
Uist	**10**	**10**	**-**	**5**	**1**	**4**	**4**	**4**	**8**
Highland									
- Sutherland	9	8	-	5	2	3	2	2	5
- Easter Ross	7	4	-	4	-	4	3	2	5
- Inverness	11	7	-	5	-	5	5	5	9
- Strathspey & Nairn	3	1	2	1	-	1	1	1	3
- Isles of Canna & Eigg	2	2	-	2	-	2	2	2	3
sub-total	**32**	**22**	**2**	**17**	**2**	**15**	**13**	**12**	**25**
North-east Scotland	**97**	**39**	**2**	**37**	**14**	**23**	**21**	**20**	**38**
Tayside & Fife									
- west of A9 and A90	31	23	3	22	5	17	16	16	32
- east of A9 and M90	20	12	1	12	-	12	10	9	24
- Angus upland	35	16	2	10	4	6	5	5	13
- Angus coastal plain	10	7	-	7	-	7	7	7	15
sub-total	**96**	**58**	**6**	**51**	**9**	**42**	**38**	**37**	**84**
Central Scotland	**35**	**22**	**4**	**21**	**1**	**20**	**18**	**18**	**38**
Argyll									
- mainland	21	13	2	11	3	8	6	5	13
- Coll, Colonsay, Islay & Tiree	9	8	-	7	3	4	4	4	5
sub-total	**30**	**21**	**2**	**18**	**6**	**12**	**10**	**9**	**18**
South Strathclyde									
- inland	42	22	6	21	6	15	12	12	30
- coast	11	9	-	8	-	8	6	6	18
- Isle of Arran	4	3	1	2	-	2	2	2	2
sub-total	**57**	**34**	**7**	**31**	**6**	**25**	**20**	**20**	**50**
Lothian & Borders									
- grouse-moor	27	8	2	8	3	5	4	3	9
- other upland area	34	16	4	16	5	11	7	6	16
- lowland farmland	22	16	2	16	2	14	10	9	22
- urban/industrial	11	8	2	8	2	6	6	5	14
- sea-cliff/coast	51	10	1	10	2	8	7	6	14
sub-total	**145**	**58**	**11**	**58**	**14**	**44**	**34**	**29**	**75**
Dumfries & Galloway									
- Kirkcudbright and Wigtown coast	34	23	4	17	-	17	15	14	30
- Moffat and Eskdale	20	12	4	12	2	10	10	10	30
- Nithsdale	26	9	1	8	1	7	6	5	12
- Galloway inland	33	16	1	16	1	15	13	13	27
sub-total	**113**	**60**	**10**	**53**	**4**	**49**	**44**	**42**	**99**
TOTAL	**633**	**338**	**47**	**302**	**58**	**244**	**209**	**198**	**449**

Table 21a: Variation in home range occupancy with land use and location on Scottish [1] Peregrines in 2007.

Habitat	Home ranges checked	Occupied by pairs	Occupied by single birds	Vacant home ranges
Managed grouse-moors	74	26 (35%)	6 (8%)	42 (57%)
Other inland locations	197	110 (56%)	19 (10%)	68 (35%)
Coastal	73	50 (68%)	8 (11%)	15 (21%)

Table 21b: Variation in breeding success with land use and location on Scottish[1] Peregrine Falcons in 2007.

Land use/location	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged	Mean brood size per monitored pair
Managed grouse-moors	20	7 (35%)	13 (65%)	9 (45%)	8 (40%)	20	1.0
Other inland locations	108	19 (18%)	89 (82%)	75 (69%)	71 (66%)	177	1.6
Coastal	38	1 (3%)	37 (97%)	33 (87%)	31 (82%)	66	1.7

[1] Based on details supplied by the following Raptor Study Groups: Tayside, South Strathclyde, Lothian & Borders and Dumfries & Galloway.

Table 22: Breeding success of Barn Owls in Scotland, 2007.

Region	Nesting locations checked	Occupied by pairs	Occupied by single birds[1]	Pairs monitored	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Highland								
- Sutherland	7	7	-	7	7	6	6	24
- Ross-shire	14	10	2	10	9	9	8	20
- Inverness & Badenoch	22	20	2	18	17	17	15	43
- Isle of Eigg	1	1	-	1	1	1	1	2
sub-total	**44**	**38**	**4**	**36**	**34**	**33**	**30**	**89**
Northeast Scotland	**33**	**25**	**7**	**19**	**10**	**10**	**10**	**30**
Tayside								
- Perthshire	3	3	-	2	2	2	2	8
- Fife	8	8	-	7	7	7	7	21
sub-total	**11**	**11**	**-**	**9**	**9**	**9**	**9**	**29**
Central Scotland								
- Clackmannan	4	4	-	4	4	4	4	15
- Stirling	23	23	-	22	21	20	20	63
- Stirling Forest: 1st clutches	36	36	-	36	36	33	33	114
2nd clutches	3	3	-	3	3	3	3	11
sub-total	**66**	**66**	**-**	**65**	**64**	**60**	**60**	**203**
Argyll								
- Cowal & Bute	19	15	2	15	15	13	11	35
- Islay	4	4	-	3	3	2	2	3
- Mull	4	4	-	4	4	4	4	11
sub-total	**27**	**23**	**2**	**22**	**22**	**19**	**17**	**49**
South Strathclyde								
- mainland	11	7	4	6	6	5	5	9
- Isle of Arran	7	7	-	7	7	7	7	15
sub-total	**18**	**14**	**4**	**13**	**13**	**12**	**12**	**24**
Lothian & Borders								
- 1st clutches	44	43	-	40	40	39	38	115
- 2nd clutches/relays	5	5	-	5	5	4	3	7
sub-total	**49**	**48**	**-**	**45**	**45**	**43**	**41**	**122**
Dumfries & Galloway								
- Wigtown & Galloway Forest	60	45	1	45	43	41	37	126
- Stranraer, The Rhins & West Wigtown	99	72	2	71	63	58	57	189
- Kircudbrightshire & Dumfries	67	49	1	49	49	47	47	171
sub-total	**226**	**166**	**4**	**165**	**155**	**146**	**141**	**486**
TOTAL	**474**	**391**	**21**	**374**	**352**	**332**	**320**	**1032**

[1] includes nesting locations with fresh signs of occupation but no birds seen or breeding

Table 23: Breeding success of Tawny Owls in Scotland, 2007.

Region	Nesting boxes checked	Nesting boxes occupied	Occupied boxes monitored	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Highland						
- Sutherland	11	6	6	6	6	13
- Black Isle	24	6	6	6	4	9
- Easter Ross	26	22	22	22	19	31
- Badenoch & Strathspey	7	7	7	7	6	14
- other areas	7	6	6	6	5	10
sub-total	**75**	**47**	**47**	**47**	**40**	**77**
Tayside	**2**	**2**	**2**	**2**	**2**	**4**
Argyll	**34**	**33**	**32**	**30**	**16**	**24**
Lothian & Borders	**30**	**12**	**12**	**12**	**12**	**23**
Dumfries & Galloway	**16**	**15**	**10**	**10**	**8**	**14**
TOTAL	**157**	**109**	**103**	**101**	**78**	**142**

Table 24: Breeding success of Long-eared Owls in Scotland, 2007.

Region	Known territories checked for occupation	Territories showing signs of occupation	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Uist	3	3	2	2	3+
Highland					
- Isle of Eigg	3	3	3	3	6
- Ross/Sutherland	2	2	2	2	6
Tayside	2	2	2	2	8
Argyll - Colonsay	3	3	3	3	6
South Strathclyde	2	2	1	1	1+
Lothian & Borders	15	5	4	4	8+
TOTAL	**30**	**20**	**17**	**17**	**38+**

Table 25: Breeding success of Short-eared Owls in Scotland, 2007.

Region	Pairs found/occupied nest sites	Additional single birds recorded	Nests monitored	Nests fledging young	Minimum number of young fledged
Orkney	49	2	1	1	1
Uist	1	1	1	1	4
Highland	4	2	3	3	6
Tayside	8	12	5	5	14
Central Scotland	4	1	1	1	1
Argyll	2	1	-	-	-
South Strathclyde	2	2	2	2	7
Lothian & Borders	6	1	4	4	9
TOTAL	**76**	**22**	**17**	**17**	**42**

Table 26: Breeding success of Common Ravens in Scotland, 2007.

Region	Home ranges checked	Home ranges occupied by pair	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Orkney	**[53]**	**53**	**53**	**1**	**52**	**[36]**	**36**	**99**
Uist	**15**	**15**	**11**	**-**	**11**	**11**	**11**	**33**
Highland								
- mainland	9	8	8	-	8	8	8	29
- Eigg	5	5	5	-	5	5	4	14
sub-total	**14**	**13**	**13**	**-**	**13**	**13**	**12**	**43**
Tayside								
- Angus & Fife	20	15	11	2	9	7	6	21
- Perth & Kinross	56	53	44	7	37	36	35	94
sub-total	**76**	**68**	**55**	**9**	**46**	**43**	**41**	**115**
Central Scotland	**41**	**39**	**34**	**6**	**28**	**27**	**27**	**58**
Argyll								
- Colonsay, Islay, & Tiree	29	27	19	5	14	14	14	52
- Cowal & Isle of Bute	64	44	37	5	32	32	31	61
sub-total	**93**	**71**	**56**	**10**	**46**	**46**	**45**	**113**
South Strathclyde								
- inland	29	24	18	4	14	14	14	37
- coastal	11	9	9	-	9	9	9	22
sub-total	**40**	**33**	**27**	**4**	**23**	**23**	**23**	**59**
Lothian & Borders								
- inland	35	29	27	4	23	23	23	68
- coastal	13	7	7	2	5	5	5	11
sub-total	**48**	**36**	**34**	**6**	**28**	**28**	**28**	**79**
Dumfries & Galloway	**28**	**24**	**16**	**2**	**14**	**14**	**14**	**37**
TOTAL	**408**	**352**	**299**	**38**	**261**	**241**	**237** [1]	**636+** [1]

[1] at 42 successful nests the brood size was not counted and estimated at 1+ young

Correction to Table 15 in the Scottish Raptor Monitoring Scheme Report 2006. A printing error created some incorrect figures against the Wigtown & Kirkcudbrightshire coast totals. No other figures were affected. The corrected row should read as follows:-

Dumfries & Galloway								
- Wigtown & Kirkcudbright coast	35	23	4	23	1	22	16	35

Annex 1: Raptor, owl and Common Raven nest site and home range data submitted under the Scottish Raptor Monitoring Scheme in 2007.

Species	Argyll	Central Scotland	Dumfries & Galloway	Highland	Lothian & Borders	Northeast Scotland	Orkney	South Strathclyde	Tayside & Fife	Uist	Shetland	TOTAL
European Honey-buzzard			1	3					1			**5**
Red Kite		43	22	74					29			**168**
White-tailed Eagle	11			21						10[1]		**42**
Eurasian Marsh Harrier							1		7			**8**
Hen Harrier	73	13	13	45	6	19	65	78	59	44		**415**
Northern Goshawk			31	3	59	38		4	1			**136**
Eurasian Sparrowhawk	22		2	2			14	57	3	4		**104**
Common Buzzard[2]	135	158	9	121	45	136	6		13	29		**652**
Golden Eagle	70	8	2	124	3	20		5	29	30[3]		**291**
Osprey	13	22	3	106	8	33			13			**198**
Common Kestrel	27		1	12			6	36	8			**90**
Merlin	7	6	7	73	55	76	21	21	68	26	37	**397**
Eurasian Hobby												**0**
Peregrine Falcon	30	35	113	32	145	97	16	57	96	10	2	**633**
Barn Owl	27	66	226	44	49	33		18	11			**474**
Tawny Owl	34		16	75	30				2			**157**
Long-eared Owl	3			5	15			2	2	3		**30**
Short-eared Owl	2	4		4	6		49	2	8	1		**76**
Common Raven	93	41	28	14	48		53	40	76	15		**408**
TOTAL	**547**	**396**	**474**	**758**	**469**	**452**	**231**	**320**	**426**	**172**	**39**	**4284**

[1]Includes some pairs monitored on Lewis & Harris.
[2]Common Buzzard totals for a study area covering parts of both Central and Tayside regions are included under Central Scotland.
[3] Includes 4 home ranges checked on Lewis & Harris.

Annex 1 shows the total number of all breeding sites and home ranges (by area) checked in 2007 and reported under the SRMS. This includes traditional nesting sites and home ranges that were found unoccupied during a single visit, and also sites and home ranges which were found occupied but received no follow-up visits, so their breeding success is unknown.

Annex 2: Raptor, owl and Common Raven breeding attempts monitored under the Scottish Raptor Monitoring Scheme in 2007.

Species	Argyll	Central Scotland	Dumfries & Galloway	Highland	Lothian & Borders	Northeast Scotland	Orkney	South Strathclyde	Tayside & Fife	Uist	Shetland	TOTAL
European Honey-buzzard				1								**1**
Red Kite		25	22	40					16			**103**
White-tailed Eagle	11			21						10[1]		**42**
Eurasian Marsh Harrier									4			**4**
Hen Harrier	36		11	21	5	11	64	48	28	29		**253**
Northern Goshawk			17		31	24			1			**73**
Eurasian Sparrowhawk	5		2	2			6	36	3	1		**55**
Common Buzzard[2]	84	112	9	112	42	28	2		13	8		**410**
Golden Eagle	56	6	2	88	2	14		5	17	26[3]		**216**
Osprey	12	18	3	65	8	19			13			**138**
Common Kestrel	3		1	10			5	13	7			**39**
Merlin	2	1	5	22	15	42	18	11	26	11	15	**168**
Eurasian Hobby												**0**
Peregrine Falcon	18	21	53	17	58	37	10	31	51	5	1	**302**
Barn Owl	22	65	165	36	45	19		13	9			**374**
Tawny Owl	32		10	47	12				2			**103**
Long-eared Owl	3			5	4			1	2	2		**17**
Short-eared Owl		1		3	4		1	2	5	1		**17**
Common Raven	56	34	16	13	34		53	27	55	11		**299**
TOTAL	**364**	**283**	**316**	**503**	**260**	**194**	**159**	**163**	**252**	**104**	**16**	**2614**

[1]Includes some pairs monitored on Lewis & Harris.
[2]Common Buzzard totals for a study area covering parts of both Central and Tayside regions are included under Central Scotland.
[3] Includes 4 home ranges checked on Lewis & Harris.

Annex 2 shows the total number of all breeding sites and home ranges (by area) that were found to be occupied and which received one or more follow-up visits in 2007, i.e. they were effectively monitored to enable breeding success and productivity to be estimated.