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Preface

Raptors are now amongst the most intensively surveyed of all animal groups in Scotland. That this is so is a great tribute to the skill, experience and energy of the two hundred and thirty members of the Scottish Raptor Study Groups. Scotland is fortunate to have such an effective group of fieldworkers who do so much of the surveying and monitoring of raptors in the evenings or at weekends.

The Scottish Raptor Monitoring Group is to be commended for producing this, its first report, on the basis of fieldwork in 2003. I thank the following members of the Group for all their work: David Stroud (Joint Nature Conservation Committee), Patrick Stirling-Aird, Wendy Mattingly, Alan Heavisides and Jon Hardey (Scottish Raptor Study Groups), Chris Wernham (British Trust for Ornithology, Scotland), Malcolm Ogilvie (Rare Birds Breeding Panel), Duncan Orr-Ewing and Jeremy Wilson (Royal Society for the Protection of Birds, Scotland), Mark Holling (Scottish Ornithologists' Club), Nigel Buxton, Helen Riley, Brian Etheridge and the Group Chairman, Des Thompson (Scottish Natural Heritage). In particular, I want to thank the Raptor Monitoring Officer, Brian Etheridge, for compiling this report so effectively based on nearly three and a half thousand raptor species breeding records provided by fieldworkers.

This is an important publication, which builds on the *Report of the UK Raptor Working Group* (published by the Department of the Environment, Transport and the Regions in 2000) and *Birds of Prey in a Changing Environment* (published by The Stationery Office in 2003). SNH endeavours to collect, collate and analyse data on numbers, distribution and breeding performance of raptors to provide the Scottish Executive with the most reliable information available on the status of these birds. Many of our most important nature conservation sites have been designated for their raptor interests and it is important we monitor these to ensure that they are sustained for future generations of people to enjoy.

John Markland
Chairman, Scottish Natural Heritage
March 2005

Introduction

This is the first report by the Scottish Raptor Monitoring Group (SRMG) on the Scottish Raptor Monitoring Scheme (SRMS) and covers the year 2003. It replaces the annual *Raptor Round Up* reports previously published by SOC on behalf of Scottish Raptor Study Groups. The report incorporates data submitted to the scheme on breeding raptors, owls and ravens primarily by the Scottish Raptor Study Groups (SRSGs) together with data from RSPB Scotland and Scottish Natural Heritage. The SRSGs consist of a consortium of ten regional raptor study groups (Figure 1) with a membership of 230 fieldworkers. Group members are enthusiastic and expert ornithologists who conduct studies in their own time. New members are always welcome and should contact the local chairmen/chairwomen.

The Scottish Raptor Monitoring Scheme was established in response to recommendations for enhanced monitoring of raptors within the *Report of the UK Raptor Working Group* (2000). The scheme came to fruition on 24 June 2002 with the signing of an Agreement by the following seven parties: SNH (Scottish Natural Heritage), JNCC (Joint Nature Conservation Committee), SRSGs, BTO Scotland (British Trust for Ornithology), RBBP (Rare Birds Breeding Panel), RSPB Scotland (Royal Society for the Protection of Birds) and SOC (Scottish Ornithologists' Club). SNH took the lead in the development of the scheme and chairs the Scottish Raptor Monitoring Group that oversees it.

The scheme has three objectives:

1. **Co-operation**: to promote better co-operation between the various bodies responsible for gathering information on Scottish raptors, in order that the SRMS will be effective.
2. **Survey and Monitoring**: 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.
3. **Data and information standards**: to maintain high and uniform standards for the collection, collation, auditing and analysis of data, and reporting of information.

Scotland is one of the first countries in Europe to establish a raptor monitoring scheme. It is hoped that the example set by Scotland will inspire other countries to establish schemes, so eventually trends and changes in Scottish raptor populations can be set in clearer UK and international contexts.

Scottish Raptor Monitoring Group

To oversee the work of the scheme, the SRMG was formed with representatives of the seven organisations who signed the Agreement. The Group is responsible for:

1. Raptor survey methods and standards;
2. Collation of data;
3. Data analysis; and
4. Reporting and publications.

Brian Etheridge, the Raptor Monitoring Officer (RMO), began work on 13 January 2003 and is employed in a part-time capacity by SNH to service this work on behalf of SRMG. This Annual Report is an important output from the group.

Achievements in 2003
Since its inception, the SRMG has achieved the following:

1. Produced text for *Raptors: a field guide to survey and monitoring*, describing survey methods for each raptor and owl species that breeds regularly in Scotland and the UK. The field guide will be published in 2005, funded by contributions from members of the SRMG and the other UK Statutory Conservation Agencies.
2. Established a system for collecting and collating raptor breeding data from all SRSG workers. This has been done by the RMO in liaison with chairmen and species coordinators from the ten SRSGs.
3. Established a national SNH grant given to the SRSG to facilitate comprehensive monitoring of raptors by providing funds for travel expenses for raptor fieldworkers and contributing to administrative costs incurred by the SRSGs in attending SRMG meetings.
4. Developed proposals for assessing the representativeness of current raptor monitoring in Scotland, and uses of raptor data to determine trends and changes in Scottish raptor populations and the factors responsible for these.
5. Produced and circulated bi-annual newsletters (*Scottish Raptor*) for members of the SRSG.
6. Attracted positive publicity for national surveys of Peregrine (2002), Golden Eagle (2003) and Hen Harrier (2004).

Future priorities
SRMG future work is as follows:

1. Establish and maintain an inventory of current survey coverage of raptors in Scotland by SRSGs and others.
2. Publish *Raptors: a field guide to survey and monitoring*.
3. Developing research to identify constraints on four key raptor species in Scotland (Hen Harrier, Merlin, Peregrine and Common Buzzard). These species framework analyses will be based on pioneering work, led by SNH, on Golden Eagle, which has identified persecution as a key constraining factor on the Scottish population (e.g. Whitfield *et al.*, 2004). The work utilises a variety of techniques including population and range modelling, GIS and statistical analyses. Many of these techniques are described in detail in *Birds of Prey in a Changing Environment* (Thompson *et al.*, 2003).
4. Maintain positive and objective reporting on issues concerning raptor surveys and conservation.

Raptor Breeding Report for 2003

The report that follows is based on the data supplied by the ten regional raptor study groups in Scotland, and others, to the Raptor Monitoring Officer for the year 2003. Nearly 3,500 returns were made covering 14 species of diurnal raptors, the four species of owl and the raven that regularly breed in Scotland. Excellent coverage was achieved for some of the scarcer upland species – in particular, Hen Harrier, Merlin, Peregrine and Golden Eagle (2003 was a national survey year for the latter species). On a regional basis, there were some impressive species totals (e.g. for Goshawk, Sparrowhawk, Common Buzzard and Barn and Tawny Owl), reflecting specialisation by individual enthusiasts. The totals summarised

in Annex 1 are of nest sites and home ranges checked and monitored by fieldworkers in 2003. For some species, the totals will include both occupied and unoccupied ranges.

Occupation of Home Ranges

In many diurnal raptors and Raven, breeding pairs are faithful to a home range, and indeed many pairs comprise the same male and female over many years. In some resident species such as Red Kite, Common Buzzard and Golden Eagle, the pair remains 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 adults will return to the same location the following year and pair up again. In long-lived species, the same pair of birds will 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, these home ranges may be occupied by a succession of breeding pairs.

Not all home ranges are 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 scarce. In some years, only a single bird may be present, caused by the death of a mate or even 'divorce'. Some home ranges may be occupied only when the population reaches a certain level and others may be vacant for long periods, sometimes because of human interference. A few home ranges may suffer irreversible habitat changes e.g. through afforestation or be subjected to increased human disturbance, and may never become regularly occupied again. However, it is important in the long-term monitoring of Scotland's bird of prey populations, that the occurrence of these events, of breeding attempts and any production of young, are accurately recorded.

Terminology

Terminologies used in this report have the following definitions and are taken from the forthcoming book *Raptors: a field guide to survey and monitoring*:

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

Home range – the area that contains the nesting station, and over which a raptor or a pair of raptors forage. A core area, in the breeding season known as the nesting territory, may be defended against birds of the same species.

Nesting station – 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 station is occupied if a single bird or pair of birds is recorded during the breeding season or if there is strong evidence that birds are present (moulted feathers, pellets, plucks, splash).

Territorial bird or pair - a single bird or pair that defend 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) lay at least one egg.

Nest site – the area immediately around and including a nest.

Nesting 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 successfully fledge. A broader definition will also include those territorial pairs that appear capable of breeding but fail to lay eggs (this can be difficult to prove without careful observations).

Productivity – the number of young produced annually, normally expressed as the mean or average number of young per breeding pair.

Persecution and observer bias: a note of warning

On some driven grouse-moors in Scotland, recent studies have shown that several species of raptors that attempt to settle or breed there suffer from human interference (Etheridge *et al.* 1998, Hardey *et al.* 2003, Whitfield *et al.* 2004). 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 may 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' effect. Such interference can also diminish the enthusiasm of a volunteer raptor worker for monitoring raptors in what they perceive to be a hostile environment. This is a habitat where there may be poor reward for their effort, where their presence may not be welcome and where some land managers may attempt to impose restrictions on access. In short, it is known that some active, voluntary raptor workers avoid some grouse-moors and instead carry out raptor monitoring in areas where the experience is more enjoyable and less stressful, and in habitats where there is no conflict either for themselves or their chosen species. The impact of this shift of effort away from some grouse-moors, particularly in regions where this form of land management may be a dominant feature, is as follows. Firstly, data collected on raptor breeding populations may not be an accurate reflection of the species status and breeding success in the region, and secondly, human interference with birds of prey may be under-recorded. Thus, some upland breeding species such as Hen Harrier, Golden Eagle or Peregrine may appear to have higher occupancy of home ranges, breeding success and productivity than is actually the case nationally across all habitats.

Figure 1: Regions/Scottish Raptor Study Group areas for Scotland, 2003.

Species Accounts

European Honey-buzzard
Pernis aviporus

It is currently believed that this species is substantially under-recorded as a breeding bird in Britain. This is because of the naturally secretive behaviour of the species, confusion with Common Buzzard, and suppression of breeding season records by well-meaning enthusiasts.

A small population is established in the Highlands. Four home ranges where breeding has occurred in previous years were checked and birds were seen at all four. One pair was proved to breed and two young were reared. At another, the female was seen at a built-up nest on 29 May but breeding is not thought to have occurred.

Red Kite
Milvus milvus

After an absence of over 100 years, Red Kites have been re-introduced to Scotland. 93 birds of Swedish origin were released over five years, 1989-93, on the Black Isle. A second re-introduction occurred near Doune, Perthshire in 1996-2001 and a third at Loch Ken, Dumfries & Galloway began in 2000 and is still active. All breeding attempts in Scotland are closely monitored by RSPB and most of the young produced are wing-tagged.

Highland
After the first breeding attempt in 1992, the Black Isle kite population showed a steady increase in numbers and spread to adjacent areas in Inverness and Easter Ross. Since 1999, however, the expansion has slowed dramatically (**Table 1**, overleaf). In 2003, for the first time, there was no increase in the population, which remained at 35 nesting pairs. Moreover, there was a fall in the number of young produced, from 87 in 2002 to 71 in 2003, nesting success remained high at 94%, but mean brood size declined, possibly linked with a reduction in the local rabbit population – a primary prey species in the breeding season. The 2003 average of 2.0 young per nesting pair is still high compared with other UK populations.

Immature kites are nomadic until they reach breeding age at two years old, after which they become resident on their breeding home range. The reduction in population growth is entirely due to a large fall in the recruitment of these young birds into the breeding population in later years. The fitting of wing-tags to most of the young produced over the past 15 years has provided some evidence of what is occurring and provides an estimate of survival to breeding age. The proportion of wing-tagged young from each year cohort that were later identified in the breeding population has fallen from an average of 37% in the period 1989-98, to only 8% in the period 1999-2001 (**Table 2**, overleaf). There has been no evidence of improvement in the years following 2001. These statistics suggest there is a disproportional loss of immature birds from the local population. Confirming why this is happening will be a vital factor in ensuring success of the reintroduction in this locality. Importantly, it appears the current low recruitment is just managing to compensate natural mortality amongst the resident ageing population.

Table 1: Red Kite population in Highland: breeding success and productivity, 1992-2003.

Year	Pairs located	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	% of pairs laying that fledged young	Total young fledged	Productivity - young/laying pair
1992	1	1	1	1	100	1	1.0
1993	5	5	3	3	60	7	1.4
1994	11	8	7	7	87	13	1.6
1995	17	15	14	11	73	26	1.7
1996	20	17	16	16	94	39	2.3
1997	27	23	20	19	83	39	1.7
1998	28	23	21	20	87	44	1.9
1999	32	30	26	23	77	54	1.8
2000	37	32	32	30	94	76	2.3
2001	40	33	31	31	91	77	2.3
2002	38	35	32	32	91	87	2.5
2003	38	35	33	33	94	71	2.0
Total	**294**	**257**	**236**	**226**	**88%**	**534**	**2.1**

Table 2. Survival of wing-tagged Red Kites to breeding age (2-3 years) in Highland.

Year	Number of wing tagged young released (1989-93) and wild-reared (from 1992)	Number of wing-tagged young entering the breeding population in later years	Percentage
1989	6	0	0
1990	19	3	15.8
1991	20	6	30
1992	25	14	56
1993	29	11	37.9
Total 1989-93	**99**	**34**	**34.3**
1994	13	4	30.8
1995	24	15	62.5
1996	38	15	39.5
1997	33	12	36.4
1998	41	11	26.8
Total 1994-98	**149**	**57**	**38.3**
1999	49	5	10.2
2000	68	4	5.9
2001	55	5	9.1
Total 1999-2001	**172**	**14**	**8.1**

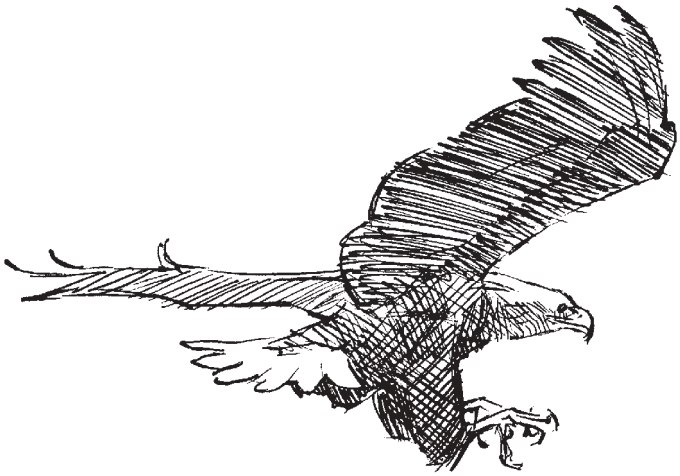
Table 3: Breeding succeess of Red Kites in Scotland, 2003.

Region	Pairs located	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Highland	38	35	33	33	71
Central	14	13	11	10	19
Tayside	5	5	5	5	15
Dumfries & Galloway	3	1	1	1	1
Total	**60**	**54**	**50**	**49**	**106**

Central
There was no increase in the breeding population in Central, and again, birds appear to be prematurely lost from the population. As in Highland, the lack of sightings suggests these missing birds are no longer alive. Of 14 breeding pairs, ten were successful in rearing 19 young.

Tayside
The tiny Tayside population, derived from the Central re-introduction scheme, increased from a single pair in 2002 to five pairs in 2003. All five pairs were successful, rearing an impressive 15 young.

Dumfries & Galloway
A batch of 20 young birds collected from Highland nests was released as part of the reintroduction scheme. Three pairs were formed from birds released in earlier years and occupied territories in the spring of 2003. One pair bred successfully and raised a single chick, the first nesting in the region for over 120 years.



White-tailed Eagle
Haliaeetus albicilla

The monitoring of this re-introduced species is organised by the RSPB and funded by SNH. Thirty-one territories were occupied, one by a trio of one male and two females. Twenty-five pairs laid eggs and 20 were confirmed as having hatched. The subsequent losses of chicks (mostly when very young) meant that only 16 pairs were successful in rearing any young. However, this was twice the number of pairs that reared young in 2002 (**Table 4**, below). There were ten broods with two young and six with a single chick (a total of 26 young), making 2003 the most successful breeding season since the start of the reintroduction project in 1975.

The nine pairs that laid but did not rear any chicks were all thought to have failed from natural causes. There was one case of deliberate persecution, a 7-year old breeding female was poisoned in late February 2003; the year after her mate was poisoned at the same location (Grant 2004).

Eurasian Marsh Harrier
Circus aeruginosus

The species consolidated its tiny population in Scotland with six nesting pairs in 2003. Five pairs reared 18 young. The inland location in west Tayside was a new breeding site. Additionally five non-breeding birds were recorded in suitable breeding habitat during the summer; four at one Highland location and a single female on Orkney (**Table 5**, overleaf).

Hen Harrier
Circus cyaneus

There has been a welcome increase in the reporting effort for this species in recent years and it is estimated that raptor study groups and others in Scotland are currently monitoring 60-70% of the UK Hen Harrier breeding population on an annual basis. In 2003, 379 home ranges were checked, and 335 (88%) of these showed signs of occupation (**Table 6**, overleaf). Monitoring

Table 4: White-tailed Eagle population, breeding success and productivity, 1994-2003.

Year	Areas occupied	Territorial pairs	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Total young fledged	Productivity young/ laying pair	Productivity young/ territorial pair
1994	11	10	8	4	4	5	0.63	0.5
1995	12	11	10	6	5	7	0.7	0.64
1996	12	12	12	8	7	9	0.75	0.75
1997	14	14	11	6	5	9	0.64	0.64
1998	19	19	16	9	9	13	0.81	0.68
1999	20	20	16	9	6	11	0.69	0.55
2000	23	22	19	12	8	12	0.63	0.55
2001	24	23	17	10	7	11	0.65	0.48
2002	26	25	22	14	8	12	0.55	0.48
2003	31	31	25	20	16	26	1.04	0.84

Table 5: Breeding succeess of Eurasian Marsh Harriers in Scotland in 2003.

Region	Pairs located	Pairs laying eggs	Pairs successfully rearing young	Minimum number of young fledged
Orkney	1	1	1	2+
Tay reed beds	4	4	3	11
West Tayside	1	1	1	4
Total	**6**	**6**	**5**	**17+**

Table 6: Breeding success of Hen Harriers in Scotland, 2003.

Region	Home ranges checked	Home ranges occupied	Occupied ranges monitored	Nests with eggs	Nests fledging young	Minimum number of young
Orkney	**51**	**51**	**51**	**51**	**20**	**56**
Uists	**32**	**32**	**18**	**18**	**13**	**36**
North Highlands						
Caithness/Sutherland/						
Ross-shire	27	19	19	16	10	38
Inverness/Nairn	4	4	4	4	4	13
Moray	12	10	10	9	8	31
Skye/Eigg	13	12	12	7	4	12
Total	**56**	**45**	**45**	**36**	**26**	**94**
Central and Eastern Highlands						
Central	14	9	9	7	6	16
Perthshire	31	25	22	20	14	43
Angus	5	5	5	3	2	7
Aberdeenshire	18	18	14	10	7	26
Total	**68**	**57**	**50**	**40**	**29**	**92**
West Highlands						
Argyll mainland	24	20	16	13	12	37
Islay	6	6	6	5	4	12
Mull/Jura	32	32	25	25	20	58
Arran	29	29	29	29	18	54
Bute	5	5	5	5	5	14
Total	**96**	**92**	**81**	**77**	**59**	**175**
Southwest & Southern Uplands						
Dumfries & Galloway	18	18	18	18	9	26
Lothian and Borders	2	2	2	2	1	5
South Strathclyde	56	38	38	29	14	45
Total	**76**	**58**	**58**	**49**	**24**	**76**
GRAND TOTAL	**379**	**335**	**303**	**271**	**171**	**529**

visits were carried out at 303 occupied home ranges and nests with clutches of eggs were found at a minimum of 271 (89%). 171 of these nests were successful (63%) giving rise to a minimum of 529 young; a mean 1.7 young per monitored occupied range. However, these figures are likely to mask strong regional effects of land management and observer preference.

On Orkney productivity and brood size since 1990 have been low, due in part to a depressed food supply. Since 2000, there has been an increase in the number of breeding females and nesting success, partly due to improvemed availability of suitable foraging habitat. Elsewher, nesting success in three regions, the Uists and the North and Central Highlands, was similar (72%) with a productivity figure of 1.8-2.1 young per occupied range. These figures were higher (77% & 2.2 young) in mainland Argyll and on the islands of Islay, Mull, Jura, Arran and Bute. These good results from the islands contrast with those from the Southwest and the Southern Uplands (49% & 1.3 young) where many of the pairs monitored were nesting on managed grouse-moors.

Orkney (Orkney RSG)
A small increase was recorded on 2002 with 51 occupied home ranges occupied. Twenty (39%) were successful and reared 56 young. A recovery of this important population appears to be underway.

Uists (Uists RSG)
Thirty-two home ranges were occupied on the three islands. Eighteen were monitored, of which 13 (72%) reared 36 young. Four of the failures were the result of disturbance by photographers (2), an army exercise and muirburn. A fifth nest was flooded.

North Highlands (Highland RSG)
Fifty-six home ranges were checked; 45 were occupied and were monitored. Nest with eggs were found at 36 and 26 (72%) successfully reared 94 young. The majority of nests (89%) were on moorland not managed for driven grouse. Four failures in Sutherland were attributed to fox predation of broods. A successful pair on Eigg was the first recorded breeding attempt on the island.

Central & Eastern Highlands
(North-east Scotland, Tayside and Central RSGs)
Sixty-eight home ranges were checked and 57 showed signs of occupation. Of the 50 home ranges that received a follow up visit, a minimum of 40 nests with eggs was located. At 29 (72%), 92 young were successfully reared. One of the main failure causes was the unexplained disappearance of clutches or broods. Noteworthy are the two pairs that successfully reared young on the grouse-moors of Angus, the first for many years.

Western Highlands & Islands
(Argyll and South Strathclyde RSGs)
This region held the most breeding pairs and enjoyed high breeding success in 2003. This area lacks driven grouse-moors and foxes are absent on the islands. Ninety-six home ranges were checked with 92 (96%) occupied by harriers. Eighty-one ranges were monitored and 77 nests with eggs located. Fifty-nine (77%) nests were successful in rearing 175 young.

Southwest and Southern Uplands (South Strathclyde, Lothian & Borders and Dumfries & Galloway RSGs)
Hen Harriers received excellent coverage in this region but nesting success remained the lowest in Scotland. This is a reflection of the high proportion of pairs that attempt to nest on active grouse-moors. Fifty-eight occupied home ranges were monitored and 49 nests with eggs were found. Only 24 (49%) were successful and 76 young were reared. Only two nesting pairs were found on the grouse-moors in Lothian & Borders. Based on the extent of suitable habitat, this area appears to have great potential for the species (**Table 6**, previous page).

Northern Goshawk
Accipiter gentilis

Highland
A very small Goshawk population occurs in this region. All four monitored sites are protected within Forestry Commission woodland.

North-east
Despite a small improvement on last year's figures, and a mean brood size of 2.33, overall productivity remains low. This was associated with wet weather in May and a large proportion of yearling females breeding (30%). The latter is symptomatic of a continuing high level of persecution.

Tayside
Three pairs were located in Tayside but only one was followed up. It raised a single chick.

Fife
Three pairs again bred in Fife and all nested successfully, rearing five young.

Dumfries & Galloway
An encouraging situation with an increase in home ranges monitored and occupied by breeding pairs. Productivity remains low, however, with only 13 young fledging from seven successful nests.

Lothian & Borders
This region would appear to support the highest population of Goshawk in Scotland and the bulk of them are in the Borders. Only a few nests were reported from Lothian and no young were reared here. Forty occupied home ranges were found but time available for searching was a constraint and the 28 active nests found is very much a minimum figure. Twenty-three (82%) were successful in rearing a minimum of 59 young, giving a mean brood size of 2.57, a figure slightly lower than in previous years.

Table 7: Breeding succeess of Northern Goshawks in Scotland, 2003.

Region	Home ranges checked	Home ranges occupied	Pairs known to lay eggs	Pairs known to fledge young	Minimum number of young fledged
Highland	4	2	2	2	6
North-east	32	23	19	16	37
Tayside	3	3	1	1	1
Fife	3	3	3	3	5
Dumfries & Galloway	19	13	9	7	13
Lothian & Borders	56	40	28	23	59
Total	**117**	**84**	**62**	**52**	**121**

Eurasian Sparrowhawk
Accipiter nisus

With the exception of an intensive study in Ayrshire, this widespread and relatively common species is poorly monitored in much of its range in Scotland. After recovering from the effects of organo-chlorine pesticides used during the 1950s and 60s, Sparrowhawks are believed to be in decline again, suggesting an urgent need for more detailed and in-depth monitoring.

Orkney
Four known nesting sites were checked on West Mainland; three were unoccupied while a fourth successfully reared young. On Hoy, a pair reared two young at one site while, at another, a breeding attempt failed during incubation.

Uists
A pair reared a single chick, the first breeding record for the Uists. Elsewhere a pair reared young in Stornoway Woods, Lewis.

Highland
On Skye, eight known nesting woods were checked; six were occupied by breeding pairs. Five were monitored and four were successful in rearing 20 young, an average of 4.0 young per breeding pair. A single nest in Easter Ross fledged five young.

South Strathclyde
In the Ayrshire study, 43 home ranges were checked and 30 of these showed evidence of occupation (70%). Twenty-seven nests were found but at one, although the nest cup was lined, no eggs were laid. Clutch size was obtained for 23 of the 26 nests laid in. At two nests, there were exceptionally large clutches of seven and nine eggs that had been laid by two females in each case. This is a very rare event affecting less than 1% of all breeding attempts (Newton 1986). Neither was successful. Discounting these two, the mean clutch size was 4.86 (n=21). Of the 24 nests occupied by a single female, 23 were monitored through the season. There were only two total failures (9%), a very low figure. The number of young in one successful brood could not be counted. The mean brood size at the other twenty successful nests was 3.8. Sex ratio of 69 young ringed was 30 males (43.5%) and 39 females (56.5%).

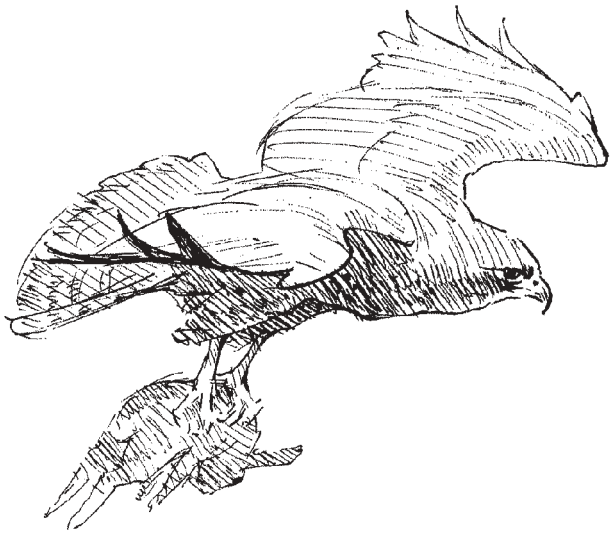
Lothian & Borders
Three nests were monitored in the Pentland Hills. All three were successful. Two broods of one and five were counted.

Common Buzzard
Buteo buteo

The species continues to expand and re-colonise former nesting areas in the east and south from which they were exterminated during the 19th century. In some study areas, Common Buzzards are now the commonest species of raptor and outnumber both Kestrel and Sparrowhawk. (**Table 8**, below)

Table 8: Breeding success of Common Buzzards in Scotland, 2003.

Region	Home ranges checked	Home ranges occupied by a pair	Breeding attempts monitored	Pairs known to lay	Pairs known to fledge young	Minimum number of young
Orkney	**4**	**4**	**4**	**2**	**1**	**2**
Skye, Canna & Eigg	21	20	20	13	12	26
Easter Ross	71	63	63	56	44	78
Sutherland	21	16	16	15	15	33
Badenoch	15	15	15	15	14	46
Inverness	3	3	3	3	3	8
Highland Total	**131**	**117**	**117**	**102**	**88**	**191**
Stirling and west Perth	23	23	23	20	17	36
Falkirk	13	13	13	12	8	15
Central Total	**36**	**36**	**36**	**32**	**25**	**51**
Colonsay	53	27	14	14	8	14
SW Mull	34	31	16	16	15	19
Islay	4	4	4	4	2	3
Bute	29	29	29	29	27	53
Argyll Total	**120**	**91**	**63**	**63**	**52**	**89**
Lothian & Borders	**51**	**50**	**50**	**47**	**43**	**102**
GRAND TOTAL	**342**	**298**	**270**	**246**	**209**	**435**



Golden Eagle
Aquila chrysaetos

The third national survey of Golden Eagles was carried out in 2003. Raptor Study Group members, other fieldwokers, RSPB, SNH staff and contract workers checked nearly 700 known home ranges (**Table 9**, overleaf). During the course of the 2003 survey analysis, the results of the 1992 national survey were re-analysed in light of a change in the definition of occupancy to include the occurrence of a built up nest even if a pair had not been seen. This resulted in a small number of territories (9) initially recorded as 'unknown' during the 1992 survey being re-classified as occupied because they were occupied in both the 1982 and 2003 surveys.

The locations of Natural Heritage Zones used in the surveys are given in **Figure 2**, overleaf. Nationally the Golden Eagle population remained approximately stable between 1992 and 2003, with an estimated 439 and 443 pairs, respectively. Notably in zone 3 (Western Isles), however, there was an estimated increase by 19 pairs, and in the absence of this substantial regional increase, the national population would have declined by 3.4%. Zone 5 (Peatlands of Caithness and Sutherland) also experienced a relatively high increase in pairs, but zones 11, 12 and 15 (all in the central and eastern Highlands) had relatively large declines. Preliminary results of analyses investigating the potential causes of regional change between the 1992 and 2003 surveys suggest that recreation and forestry were unlikely to have been influential above a local scale, and there was no consistent evidence for any influence of changes in deer or sheep numbers. The regional patterns of change were also not consistent with any weather-mediated effects.

The regional changes in occupied eagle territories were consistent with changes in an index of Golden Eagle persecution (see Whitfield *et al.*, 2004). Evidence of recent reductions in persecution in the Western Isles and in the Peatlands of Caithness & Sutherland has seen recent increases in Golden Eagle territory occupation. However, there was no evidence for any recent downturn in human interference in the four main Highland regions where grouse moor management predominates (Central Highlands, Cairngorms Massif, North East Glens, Breadalbane & East Argyll) and here the population declined by 21% between the two recent national surveys, and 85 of 140 known territories (61%) were vacant in 2003. The 2003 decline of occupied eagle territories in areas where human interference is widespread was as predicted by earlier analyses of the 1982 and 1992 survey results. In the absence of any change in raptor persecution, the markedly high proportion of vacant territories will likely persist and further declines may occur. In zone 12 (North East Glens) only 3 pairs remained in 16 known territories, and the Golden Eagle here is in imminent danger of disappearing as a breeding species. (Contributed by Phil Whitfield.)

Figure 2: National Heritage Zones (NHZ) used in the national Golden Eagle surveys of 1992 and 2003

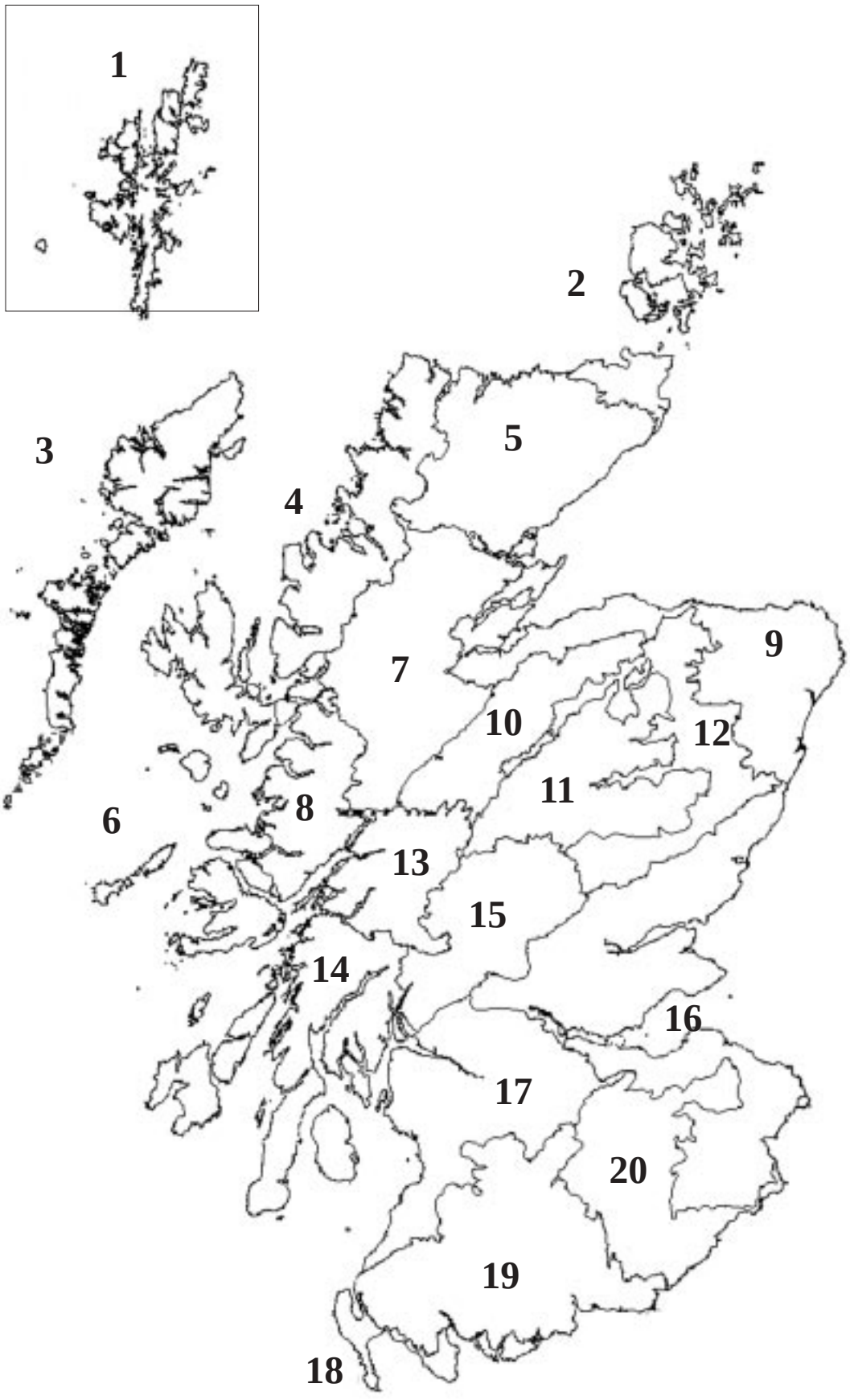


Table 9: Golden Eagle home range occupation - 1992 and 2003 national survey results.

NHZ name	NHZ	Known home ranges	Active 1992	Active 2003	Vacant 2003	% vacant 2003
North Caithness and Orkney	2	1	0	0	1	100.0
Western Isles	3	94	62	81	13	13.8
North West Seaboard	4	71	45	46	25	35.2
Caithness and Sutherland	5	31	13	18	13	41.9
Western Seaboard	6	95	74	74	21	22.1
Northern Highlands	7	91	45	43	48	52.7
Western Highlands	8	69	54	51	18	26.1
Central Highlands	10	26	12	12	14	53.8
Cairngorms Massif	11	71	32	28	43	60.6
North East Glens	12	16	6	3	13	81.3
Lochaber	13	36	28	25	11	30.6
Argyll West and Islands	14	60	44	44	16	26.7
Breadalbane and East Argyll	15	27	20	12	15	55.6
Eastern Lowlands	16	1	0	1	0	0
Western Southern Uplands and Inner Solway	19	4	3	2	2	50
Border Hills	20	4	1	3	1	25
TOTAL		**697**	**439**	**443**	**254**	**36.4**

Table 10: Breeding success of Ospreys in Scotland, 2003.

Region	Nest sites checked	Pairs present	Pairs known to lay eggs	Pairs known to fledge young	Minimum number of young fledged
Highland	133	76	62	47	99
North-east	18	18	17	15	31
Tayside	53	45	38	29	60
Central	15	12	12	9	23
Argyll	7	7	7	6	9
Dumfries & Galloway	1	1	1	1	1
Lothian & Borders	5	3	3	2	6
TOTAL	**232**	**162**	**140**	**109**	**229**

Osprey
Pandion haliaetus

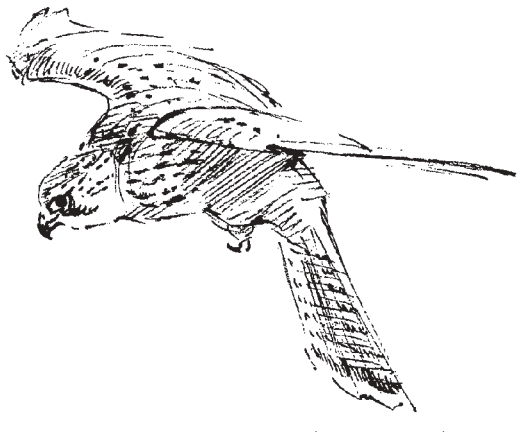
In 2003, 162 occupied nests were located in Scotland, a small increase of four over the 2002 total. A minimum of 140 pairs laid eggs and 109 pairs (78%) fledged young. The excellent spring and summer weather contributed to the successful rearing of 229 young, making 2003 the best year yet for the production of young (**Table 10**, previous page).

Highland
Poor weather over Spain and the Bay of Biscay during the spring migration may have been responsible for the loss of some established pairs and single birds, causing disruption at some nests by new individuals attempting to secure breeding sites. Consequentially, the 62 pairs that laid eggs in 2003 was one down on the previous year. Twelve pairs failed at the egg stage and three with young. No failures were thought due to be due to human robberies. The 47 pairs that reared young was two down on 2002. There were concerns in some areas that fish availability had declined and caused a reduction in pairs and breeding success.

North-east
Eighteen pairs were located and 17 laid eggs, which is an increase of three over the previous year. They enjoyed an excellent breeding season and 15 pairs were successful in rearing 31 young, the best year ever.

Tayside
There are 57 known breeding territories in the region and 53 were checked for occupation. Forty-five pairs were again found breeding and at least 38 laid clutches of eggs, two down on the previous year. 29 pairs (76%) were successful in rearing 60 young. Four of the pairs bred successfully on electricity pylons but the number of young reared at two of them could not be counted from the ground and have been entered as 1. Therefore, the total number of young reared in Tayside could be higher than 60. In addition, landowners denied access to two known nests in the region. Their occupation status and outcome is unknown.

South and West Scotland (Argyll, Central, Dumfries & Galloway and Lothian & Borders)
The breeding population continued to increase with 23 pairs laying eggs. Eighteen successful pairs (78%) reared 39 young. Although broods in Argyll were generally smaller than other areas, overall there was good productivity resulting in a record number of chicks fledging. Non-breeding pairs were present at several new areas in 2003.



Common Kestrel
Falco tinnunculus

Kestrels in lowland cultivated farmland are now greatly reduced, probably due to the reduction of voles following agricultural intensification in recent decades. In the uplands, breeding numbers appear buoyant. In 2003, with vole numbers increasing after the low point in 2002, the number of kestrel breeding pairs located and their resultant nesting success were all higher than the preceding year. Six raptor study groups supplied data for 2003 (**Table 11**, overleaf).

Orkney
Of the four pairs monitored, three were on the ground in heather, a nesting habit for Kestrel unique to Orkney. Two of the four pairs, both ground nesters, failed in their breeding attempt.

Highland
Eleven pairs were monitored through the breeding season, seven on the mainland and four on Eigg. There were no breeding failures and a minimum of 40 young fledged.

Tayside
Two pairs were monitored and reared six young.

Argyll
Three pairs, all on Islay, were monitored. All three successfully reared six young in total.

South Strathclyde
The long running Ayrshire study located 20 pairs on site. Three pairs failed in the pre-laying period. Seventeen pairs laid clutches, but one pair, which laid a late clutch of only two eggs, failed early. The remaining 16 pairs were successful and reared 62 young.

Lothian & Borders
Twenty-two pairs were located in the Pentland Hills study area, 17 breeding attempts were monitored. Clutch size was obtained from 12 nests. Half the pairs studied used the artificial nests supplied, either nest boxes (6) or baskets (3). Only one pair from the 17 failed, with 16 pairs rearing 64 young. This excellent productivity is very similar to that obtained in the Ayrshire study. The two study areas are 85 kms apart.

There are two intensive studies currently being carried out on this attractive and familiar falcon; Gordon Riddle's long-term study in Ayrshire (South Strathclyde) and a new one centred on the Pentland Hills (Lothian & Borders) by Sheila Cormack and Chris Bauer (**Table 12**, overleaf).

Table 11: Breeding success of Common Kestrels in Scotland, 2003.

Region	Nest sites checked	Pairs present	Nest sites monitored	Pairs known to lay eggs	Pairs known to fledge young	Minimum number of young fledged
Orkney	4	4	4	4	2	6+
Highland	8	8	7	7	7	32
Isle of Eigg	4	4	4	4	4	8+
Argyll - Islay	4	4	3	3	3	6
Tayside	2	2	2	2	2	6
South Strathclyde	30	20	20	17	16	62
Lothian & Borders	22	22	17	17	16	64
TOTAL	**74**	**64**	**57**	**54**	**50**	**184+**

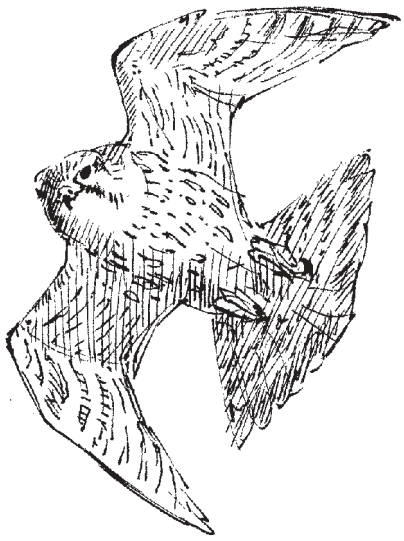
Table 12:Clutch and brood size of Common Kestrels in two study areas in south Scotland, 2003.

Study area	Pairs monitored	4 eggs	5 eggs	6 eggs	Mean clutch size	2 young	3 young	4 young	5 young	6 young	Mean brood size/ pair laying
Pentland Hills	17	2	7	3	5.08	2	3	4	7	0	3.76
South Ayrshire	16*	-	7	6	5.46	2	5	3	5	1	3.87

**** An additional late clutch of only 2 eggs which failed early has been excluded.***

Merlin
Falco columbarius

In 2003, 387 Merlin home ranges were checked and 242 (63%) were occupied (**Table 13**, overleaf). Some nests could not be located or their fate was not subsequently monitored. Of the 190 nests and eggs that were checked, 153 (82%) reached the hatching stage and 141 (75%) successfully fledged young. A minimum of 476 young reared gave a mean brood size of 3.4, and a mean productivity figure of 2.5 young per nesting pair. The reasons for breeding failure were generally not known: desertion, broken eggs, persecution, and late muirburn were all reported but predation of young (presumably by foxes) was the main identifiable cause.



Shetland
Ten home ranges were visited and five breeding pairs were found. Two were successful rearing seven young.

Orkney
Sixteen home ranges checked were occupied by breeding pairs. Ten were successful in rearing 29 young; a small decline on the 2002 figures of 12 successful pairs and 41 young.

Uists
Nine home ranges checked were occupied. Breeding success was monitored at five. One nest failed at the egg stage due to disturbance, the remaining four nests reared eight young.

Highland
In a Sutherland study, 53 home ranges were checked for occupancy and pairs occupied 37 of them. Fourteen of these sites were monitored closely. Eleven pairs produced clutches and nine were successful in rearing 29 young. In a second study area covering west Moray and Nairn, 21 home ranges were checked and ten were occupied by pairs and monitored. All ten pairs succeeded in rearing 27 young. Overall in Highland 65% of home ranges were occupied by pairs and 84% of monitored pairs that laid eggs were successful in hatching young. Fledging success was excellent with 77% of laying pairs rearing young. Average brood size per successful pair was 3.4 young. Productivity was 2.6 young per laying pair.

North-east
There are four intensive study areas in this region. All received excellent coverage and had similar productivity results. Occupancy of home ranges ranged from 41-62%, average 50%. Of the monitored pairs that laid clutches of eggs, 86% hatched young and 78% were successful in rearing young. Average brood size per successful pair was 3.6 young and productivity was 2.8 young per laying pair. The similarity of these figures with Highland and Tayside is striking.

Tayside
Merlins in the two study areas in Tayside, in Angus and Perthshire, also enjoyed a better than average breeding season, though not quite as successful as Highland or North-east. Known home ranges had a 67% occupancy rate, with 81% of pairs that laid eggs reaching the chick stage and 69% of pairs successfully rearing young to fledging. Mean brood size per successful pair was 3.4 young and the productivity was 2.4 young per laying pair.

Table 13: Breeding success of Merlins in Scotland, 2003.

Region & study area	Home ranges checked	Home ranges occupied by a pair	Monitored pairs laying clutches	Pairs known to hatch eggs	Pairs known to fledge young	Estimated number of young fledged
Shetland	**10**	**5**	**5**	**(2)**	**2**	**7**
Orkney	**16**	**16**	**16**	**10**	**10**	**29**
Uists	**9**	**9**	**5**	**4**	**4**	**8**
Highland						
Sutherland	53	37	14	11	9	29
Skye & Rum	6	4	4	2	2	4
Ross-shire	3	3	3	3	3	11
Nairn	7	5	5	5	5	17
West Moray	14	5	5	5	5	20
sub-total	**83**	**54**	**31**	**26**	**24**	**81**
North-East						
Lower Deeside	24	10	9	8	8	31
Mid/Upper Deeside	29	18	17	15	12	47
Donside	22	9	9	7	7	25
East Moray	28	15	15	13	12	39
sub-total	**103**	**52**	**50**	**43**	**39**	**142**
Tayside						
Perthshire	49	32	23	19	16	52
Angus	20	14	13	10	9	34
sub-total	**69**	**46**	**36**	**29**	**25**	**86**
Argyll	**9**	**5**	**3**	**2**	**2**	**2**
South Strathclyde	**11**	**11**	**9**	**8**	**7**	**21**
Dumfries & Galloway	**20**	**9**	**4**	**2**	**2**	**8**
Lothian & Borders						
Pentland Hills	6	5	5	4	3	10
South of Peebles	9	9	7	6	6	20
Moorfoot Hills	12	6	6	5	5	16
Lammermuir Hills	30	15	13	12	12	46
sub-total	**57**	**35**	**31**	**27**	**26**	**92**
GRAND TOTAL	**387**	**242**	**190**	**153**	**141**	**476**

Argyll
Nine home ranges were checked and five showed signs of occupancy. At least two pairs probably reared young but no counts of broods were made.

South Strathclyde
Eleven home ranges checked were occupied and nine nests with eggs were located. There was one confirmed failure and one unknown outcome. Seven pairs successfully reared 21 young.

Dumfries & Galloway
Twenty home ranges were checked. Only nine (45%) were occupied by breeding pairs. Four of these received further monitoring checks. Two were successful in rearing eight young. The remaining two, both on grouse-moors, failed due to human interference.

Lothian & Borders
In both the Lammermuir and Moorfoot Hills study areas, 50% of home ranges checked were occupied. In the largest study in the Lammermuir Hills, amongst 13 laying pairs there was only a single failure during incubation and none during the fledgling period. Twelve pairs raised 46 young. Overall in the region hatching success at 84% was high and 77% of pairs reared young. Mean brood size was 3.5 per successful pair and the productivity was 3.0 young per laying pair.

Eurasian Hobby
Falco subbuteo

In Highland, three pairs were located. At a nest territory used in 2001 and 2002, the male was back on 28 April, the earliest ever record. The used nest was found late in the season but it was considered the pair had laid and failed. No young were reared. Another pair probably bred but the nest was not found; birds were seen from late May to August including prey being carried. A third pair was seen prospecting at a potential nest site in early June but probably moved to another location and they were not relocated, though there were occasional reports from the area.

Peregrine Falcon
Falco peregrinus

The previous year, 2002, was the national survey year. In 2003, monitoring of home ranges remained at a high level in all regions except Highland and Argyll, the two areas identified during the 2002 survey as having both low home range occupancy and low breeding success (**Table 14**, overleaf).

Orkney
Of the fifteen home ranges checked, thirteen were occupied (two by single birds). Eleven pairs were thought to have bred but only four pairs reared any young. Ten young fledged. Productivity at 0.8 young fledged per occupied home range remains low.

Uists
Sixteen home ranges were checked and ten showed signs of occupancy. Nine pairs laid clutches of eggs and there was only a single breeding failure. Sixteen young were reared, giving a productivity figure of 1.6 young fledged per occupied home range.

Highland
Thirty-five home ranges received early spring visits. Five were un-occupied, pairs occupied 27 and single birds occupied three. Seven of the pairs received no further visits. From the 20 laying pairs that were monitored, 17 were successful in rearing a minimum of 45 young, including six broods of four young. The average brood size of 2.25 young fledged per pair monitored suggest that a further 15-16 young may have been reared by the seven pairs which received only a single visit. This would give a high productivity figure of 2.0 fledged young/occupied home range; a figure more than three times greater than the 2002 survey year. However, most effort in 2003 was directed at pairs breeding in the more productive south and east of the region and, therefore, the results are not directly comparable with the 2002 data, which included home ranges in the unproductive north and west.

North-east
An unusual breeding year in the North-east. Some regular home ranges at lower altitudes were not occupied and overall the breeding success was low except for some lowland quarry sites. On the coast, only two home ranges fledged young out of the 19 that were occupied. One pair was illegally poisoned. There are 128 known home ranges in the region and 109 (85%) were checked in 2003. Occupancy was recorded at 59 and clutches of eggs were laid at 47 locations. Fledged young were recorded at 25 nests (53% of pairs laying) and a minimum of 56 young was reared. This gives a productivity figure of 0.9 fledged young per occupied home range, a figure slightly down on the previous two years but very close to the long term average.

Tayside
Most breeding locations in Tayside are on or in close proximity to upland heath or grouse-moor. 105 home ranges were checked in the region and 70 showed signs of occupancy. Fifty-one pairs laid eggs and 41 (80%) fledged at least one young. A minimum of 80 young were reared, giving a productivity of 1.1 fledged young per occupied home range, a figure the same as 2002.

Fife
Although covered by members of the Tayside RSG, Fife has been treated separately here as the majority of pairs in the region are nesting either in lowland farmland quarries or other man-made structures such as power stations or lighting towers. Thirteen home ranges were checked and pairs occupied 11. Nine pairs were confirmed as laying eggs. The other two pairs may have laid but they definitely did not raise any young. Six (67%) of the nine laying pairs were successful in fledging 10 young. Productivity was 0.9 young fledged per occupied home range.

Central
Thirty home ranges were checked, 22 were occupied by pairs and one by a single bird. Eggs were laid by at least 16 pairs. A further four may have laid and failed early or were non-breeding. Of the 16 pairs, only two (13%) failed during the breeding cycle and 14 pairs (87%) fledged 21 young. Brood size was small; there were ten broods with only a single chick. This contributed to the low productivity of 0.9 young fledged per occupied home range.

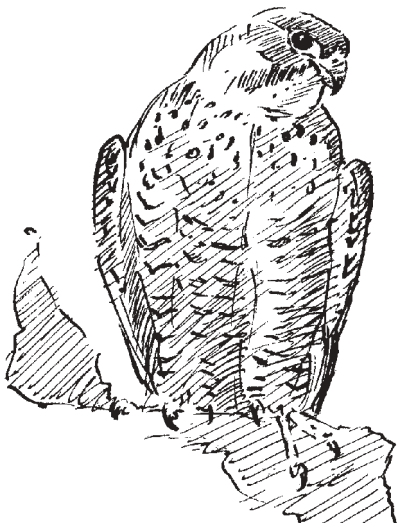
Argyll
Twenty-eight home ranges were checked in 2003. Four were unoccupied, three had only single birds and 21 were occupied by a pair. Of these, three were not followed up, at a further four the pair either failed early or were non-breeding and at only one was non-breeding confirmed. Egg laying was confirmed in 13 home ranges and there was only a single recorded breeding failure. The 12 successful broods were small, either singles or twins and only 18 young were reared. Productivity was low at 0.9 fledged young per occupied home range.

South Strathclyde
Home ranges in this area are sub-divided into two groups; inland home ranges are in upland forestry, sheepwalk and grouse-moor and coastal home ranges have access to coastal farmland. The same land use divisions are made in Dumfries & Galloway and Lothian & Borders.

Inland
Thirty-seven home ranges were checked, 19 were occupied by pairs and at 17 ranges, egg laying was confirmed (the remaining two pairs may have laid but failed early, and no young were reared). Of the 17 monitored nesting attempts, only nine were

Table 14: Breeding success of Peregrines in Scotland, 2003.

Region	Home ranges checked	Home ranges occupied	Pairs known to lay eggs	Pairs known to fledge young	Minimum number of young fledged
Orkney	15	13	11	4	10
Uists	16	10	9	8	16
Highland	35	30	20	17	45
North-east	109	59	47	25	56
Tayside	105	70	51	41	80
Fife	13	11	9	6	10
Central	30	23	16	14	21
Argyll	28	24	13	12	18
South Strathclyde inland	37	19	17	9	18
South Strathclyde coast	11	9	7	6	16
Dumfries & Galloway inland	77	51	34	20	44
Dumfries & Galloway coast	32	24	20	17	30
Lothian & Borders inland	70	49	38	24	62
Lothian & Borders coast	17	10	7	6	14
TOTAL	**595**	**402**	**299**	**209**	**440**



successful. Three of the failures occurred on grouse-moors where human interference was suspected. Two other breeding attempts failed due to disturbance by climbers and firemen fighting a muirburn. Eighteen young successfully fledged. The productivity was 0.9 young fledged per occupied home range.

Coastal
Eleven coastal home ranges were checked. Nine were occupied but at one, only a single male was present. Seven pairs were confirmed to lay eggs, though the eighth may have laid eggs but failed early. Six pairs were successful in rearing 16 fledged young. The productivity at 1.8 young fledged per occupied home range was double that recorded at inland locations.

Dumfries & Galloway

Inland
Seventy-seven home ranges were checked. Pairs were present at 47 home ranges, and single birds were recorded at an additional four. Thirty-four pairs were confirmed to lay eggs. More pairs may have laid but early failures either natural or through human interference, etc. would not have been detected. Twenty pairs were successful in fledging 44 young. This provides a productivity figure of 0.9 young fledged per occupied home range.

Coastal
Of the 32 home ranges checked, pairs occupied 24. Twenty-one received follow-up visits and 20 laid clutches of eggs. There were only three breeding failures with 17 successful pairs rearing a minimum of 30 young. Productivity of this coastal population was 1.4 young fledged per occupied home range.

Lothian & Borders

Inland
Seventy home ranges were checked and 49 showed signs of occupancy. At least 38 pairs were known to lay eggs of which 24 were successful in rearing a minimum of 62 young. Productivity was 1.3 young per occupied home range.

Coastal
Seventeen home ranges were checked and ten were occupied. Seven pairs laid eggs and six were successful and fledged 14 young. Productivity was 1.4 young per occupied home range.

Barn Owl
Tyto alba

2003 has been the best year yet for the submission of breeding data under the SRMS for Barn Owl in Scotland. This is an encouraging trend, particularly as breeding conditions in 2003 appears to have been highly favourable for the species. Tables 15 and 16 show some impressive results. A total of 257 known nesting locations were checked and 238 (93%) were occupied by Barn Owls. 225 pairs laid clutches of eggs (95% of occupied nesting locations) and 209 pairs (93% of laying pairs) were successful in rearing 666 young. Moreover, five successful breeding pairs in Dumfries & Galloway reared second broods (Table 16), producing an additional 15 young and raising the number of young they individually reared in 2003 to 5, 6, 7, 8 and 10. Combining these data gives a productivity figure of 2.97 young per breeding attempt or 3.04 per nesting pair.

Highland
This is the most northerly breeding population in Europe. The 18 pairs monitored were scattered throughout east Sutherland, Easter Ross, the Black Isle and Inverness. Two nests failed (both deserted clutches of seven eggs). Sixteen successful pairs reared a minimum of 39 young.

Tayside
Two nesting pairs were reported. Both reared broods of two.

Central
Twenty-nine nesting pairs were located and 27 were monitored. Four pairs failed during the egg stage. Three of these re-laid but the outcome of the second attempts was not known. The 62 young reared by the 23 successful pairs is therefore a minimum figure.

Argyll
A large fall in the number of pairs monitored in this region from 54 in 2002 to seven in 2003 is disappointing. All seven bred successfully, rearing 24 young.

Table 15: Breeding success of Barn Owls in Scotland, 2003.

Region	Nesting locations checked	Nesting locations occupied	Pairs known to lay eggs	Pairs known to fledge young	Minimum number of young fledged
Highland	**20**	**19**	**18**	**16**	**39**
Tayside	**2**	**2**	**2**	**2**	**4**
Central	**29**	**29**	**27**	**23**	**62**
Argyll	**7**	**7**	**7**	**7**	**24**
Dumfries &Galloway					
Galloway Forest	24	24	23	18	67
West Wigtownshire	82	73	65	65	183
Kirkudbrightshire & Dumfries	37	35	35	32	119
Langholm area	44	35	35	35	112
Dumfries & Galloway total	**187**	**167**	**158**	**150**	**481**
Lothian & Borders	**15**	**14**	**14**	**11**	**46**
TOTAL	**260**	**238**	**226**	**209**	**656**

Note: Table excludes details of double broods (five involving 15 young in Dumfries & Galloway - see text) but includes two relays after an early clutch failure

Table 16: Clutch size, brood size and productivity of Barn Owls in Scotland, 2003.

Region	Mean clutch size (n)	Mean brood size per successful pair (n)	Productivity - young per laying pair	Nesting success
Highland	4.89 (9)	2.53 (15)	2.28 (18)	89%
Central	4.90 (10)	2.74 (23)	2.33 (27)	85%
Argyll		3.43 (7)		100%
Dumfries & Galloway				
1st clutch	5.04 (48)	3.24 (148)	3.07 (156)	95%
2nd clutch	4.25 (4)	3.00 (5)	3.00 (5)	100%
Lothian & Borders	6.00 (7)	4.18 (11)	3.29 (14)	79%

Dumfries & Galloway

There are four major breeding studies being undertaken in this region:

Galloway Forest

Twenty-four occupied sites were monitored. A single male occupied one site. Twenty-three pairs laid clutches. There were five breeding failures, all occurring in nest boxes at the small young stage. Eighteen pairs produced a minimum of 72 young in 19 successful broods. This includes a second brood of five young reared by one pair following an earlier brood of five.

West Wigtownshire

This large study found 73 occupied sites at 82 known nesting locations. At three sites, only a single bird was present and five pairs apparently did not breed. There were no nesting failures amongst the 65 pairs that laid complete clutches, an indication of an abundant food supply, and 183 young were reared.

Kirkcudbrightshire & Dumfries-shire

Thirty-seven known nesting locations were checked and 35 were occupied by breeding pairs. Only three pairs failed in their nesting attempts and 36 successful pairs reared 119 young. Four of these pairs went on to lay further clutches and all four were successful for the second time and reared an additional ten young.

Langholm area

In this study, 44 nesting stations were checked for occupancy and 35 nesting pairs were found. There were no breeding failures and 112 young fledged.

Lothian & Borders

There were three breeding failures amongst the 14 pairs found breeding. The 11 successful pairs reared forty-six young.

Tawny Owl
Strix aluco

Three raptor study groups supplied breeding data in 2003 (See **Table 17**, below).The species appeared to have enjoyed a better than average breeding season with few failures and some large broods. Mean brood size per successful pair was the same at 2.2 young in both Highland and Dumfries & Galloway. Overall, the average productivity, at 1.9 young per pair laying eggs, was high.

Long-eared Owl
Asio otus

One of the most secretive of owl species in Scotland, the Long-eared Owl is easily overlooked in the breeding season. Only three raptor study groups reported on the species (see **Table 18**, below). Breeding success appears to have been good in the small sample of nests monitored.

Table 17: Breeding success of Tawny Owls in Scotland, 2003.

Region	Laying pairs monitored	Pairs known to hatch eggs	Pairs known to fledge young	Minimum number of young fledged	Nesting success	Young fledged per pair laying
Highland	**42**	**38**	**35**	**76**	**83%**	**1.8**
Tayside	**4**	**3**	**3**	**6**	**75%**	**1.5**
Dumfries & Galloway	**24**	**22**	**22**	**49**	**92%**	**2.0**

Table 18: Breeding success of Long-eared Owls in Scotland, 2003.

Region	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Highland	**7**	**7**	**18**
Argyll	**2**	**2**	**2**
Lothian & Borders	**7**	**7**	**12**

Short-eared Owl
Asio flammeus

In Highland, the species was noticeably scarce and no breeding attempts were recorded. Elsewhere, twenty-six breeding reports were received from three raptor study groups; Tayside (7), Lothian & Borders (11) and Argyll (8). Eleven nests were monitored. One failed with small young and ten successfully reared a minimum of 21 young. Brood size was in the range 1-5. The SRMG is preparing to carry out detailed work on this species in future years.

Common Raven
Corvus corax

The Raven is currently increasing both in numbers and range in Scotland and is now appearing in areas from which it has been absent for over 150 years. Comprehensive monitoring data was received from seven raptor study groups in 2003 (see **Table 19**, below). In total, 168 occupied home ranges were located. Clutches were laid by 148 pairs and 127 pairs (86%) were successful in rearing a minimum of 363 young. Average brood size was 2.9 young per successful pair, 2.5 young per laying pair and 2.2 young per occupied home range.

Table 19: Breeding succeess of Common Ravens in Scotland in 2003.

Region	Home ranges known to be occupied	Pairs known to lay eggs	Pairs known to fledge young	Minimum number of young fledged
Orkney	6	6	6	18
Highland	23	20	18	43
Tayside	37	29	22	55
Central	24	19	17	38
Argyll	43	41	33	111
South Strathclyde	14	14	12	37
Dumfries & Galloway	20	19	19	57

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Addendum to Raptor Roundup 2002. Supplement to *Scottish Birds* 24 (2003).

Unfortunately, there were several errors under the first heading of Table 7 on page 14. The total figures were, however, correct. The amended table is reproduced in full below.

Osprey
Pandion haliaetus

Table 7: Breeding success of Ospreys in Scotland, 2002.

Region	Pairs located	Pairs known to lay eggs	Pairs known to fledge young	Minimum number of young fledged
Highland	75	64	50	114
North- east	16	14	13	28
Tayside	44	36	27	50
Central	13	11	6	11
Argyll	5	5	3	6
Southern Scotland	4	4	2	4
TOTAL	**157**	**134**	**101**	**213**

Annex 1: Raptor and Raven nest sites and home ranges. *Numbers give totals for each area, based on data records submitted under the Scottish Raptor Monitoring Scgeme in 2003 (some area breakdowns are not given to protect localities).*

Raptor Study Group or Organisation	Argyll	Central Scotland	Dumfries & Galloway	Highland	Lothian & Borders	North-east Scotland	Orkney	South Strathclyde	Tayside	Uists	RSPB Scotland	2003 National Survey	TOTAL
Honey Buzzard			2										**2**
Red Kite											79		**79**
White-tailed Eagle											32		**32**
Marsh Harrier				1			2		1				**4**
Hen Harrier	67	14	18	53	2	21	51	85	36	32			**379**
Goshawk			19	4	56	32			6				**117**
Sparrowhawk				9	3		6	27		2			**47**
Buzzard	120	36		138	52		4						**350**
Golden Eagle												652	**652**
Osprey		15	1	74	9	18			52				**169**
Kestrel	4			12	22		4	30	2				**74**
Merlin	9		20	90	50	103	16	11	71	11			**381**
Hobby				1									**1**
Peregrine	28	30	113	35	87	111	15	49	122	20			**610**
Barn Owl	7	32	191	20	15				2				**267**
Tawny Owl	1		24	44					4				**73**
Long-eared Owl	2			7	9								**18**
Short-eared Owl	6				10				7				**23**
Raven	49	25	20	24			6	15	40				**179**
TOTAL	**293**	**152**	**406**	**514**	**315**	**285**	**104**	**217**	**343**	**65**	**111**	**652**	**3457**

Annex 2: Special Protection Areas (SPAs) classified for raptors in Scotland. *Numbers are at time of SPA classification: pairs present (breeding) or total number of birds (non-breeding Hen Harriers).*

CLASSIFIED SPA	Unitary Authority	Breeding						Non-breeding
		Hen Harrier	Golden Eagle	Osprey	Merlin	Peregrine	Short-eared Owl	Hen Harrier
Abernethy	**Highland**			2				
Arran Moors	**Ayrshire (north)**	24						
Caenlochan	**Aberdeenshire, Perth & Kinross, Angus**		6					
Cairngorms	**Aberdeenshire, Highland**		12	2	14	12		
Caithness & Sutherland Peatlands	**Highland**	14	5		54		30	
Cromarty Firth	**Highland**			1				
Cuillins	**Highland**		11					
Dornoch Firth & Loch Fleet	**Highland**			10				
Drummocheter Hills	**Highland**				7			
East Caithness Cliffs	**Highland**					6		
Forest of Clunie	**Perth & Kinross**	28		7	12		20	
Glen App-Galloway Moors	**Ayrshire (South), Dumfries & Galloway**	20						
Glen Tanar	**Aberdeenshire**	2		2				
Hoy	**Orkney Islands**					6		
Inner Moray Firth	**Highland**			4				
Langholm-Newcastleton Hills	**Dumfries & Galloway, Scottish Borders**	17						
Lewis Peatlands	**Western Isles**		6		20			
Loch of Inch & Torrs Warren	**Dumfries & Galloway**							8
Moray & Nairn Coast	**Moray, Highland**			7				
Muikirk & North Lowther Uplands	**Ayrshire (east), South Lanarkshire, Dumfries & Galloway**	30			12	9	30	10
Mull Coast & Hills	**Argyll & Bute**		9					
North Caithness Cliffs	**Highland**				6			
North Harris Mountains	**Western Isles**							
Orkney Mainland Moors	**Orkney Islands**	30					20	13
Rinns of Islay	**Argyll & Bute**	7						
River Spey & Insh Marshes	**Highland**			4	6			11
Ronas Hill - North Roe & Tingon	**Shetland Islands**							
Rum	**Highland**		4					
TOTAL		**172**	**60**	**39**	**125**	**39**	**100**	**42**