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Preface

This second report of the Scottish Raptor Monitoring Scheme is an important publication, building 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 number, 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 these interests are sustained for future generations of people to enjoy.

The Scottish Raptor Monitoring Group is to be commended for producing their second report, based on fieldwork in 2004. I would like to thank the following members of the Group for all their work: David Stroud (Joint Nature Conservation Committee), Patrick Stirling-Aird, Wendy Mattingley, Alan Heavisides and Jon Hardey (Scottish Raptor Study Groups), Humphrey Crick and Chris Wernham (British Trust for Ornithology), 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. It is again based on nearly three and a half thousand breeding reports provided by raptor fieldworkers.

Raptors inspire fascination and respect in many people. Most Scottish raptor populations are now recovering and many are at a higher level than at anytime in the past 200 years. However, despite full legal protection since 1954, problems associated

with illegal killings remain and restrict the distribution and abundance of several species. In recent years, birds of prey, particularly Common Buzzards and Peregrines, have become more visible to the public, often occurring within or on the edge of towns and cities. This increasing familiarity with raptors is welcomed by many people. Regrettably, Red Kites (this report), Hen Harriers (Etheridge *et al.* 1997) and Golden Eagles (Whitfield *et al.* 2004) are species for which persecution levels are still sufficient to prevent their populations from increasing and spreading over parts of their former range.

Raptors are amongst the most intensively surveyed of all animal groups in Scotland. This 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 indeed to have such an effective group of fieldworkers who do so much of the raptor surveying and monitoring in their own time.



Andrew Thin
Chairman, Scottish Natural Heritage
September 2006

Introduction

This is the second report by the Scottish Raptor Monitoring Group (SRMG) on behalf of the Scottish Raptor Monitoring Scheme (SRMS). The aim is to provide clear and factual information on breeding birds of prey during 2004. The format follows closely that used in the first report (Etheridge 2005).

The Scottish Raptor Monitoring Scheme (SRMS)

The SRMS came into being on 24 June 2002 with the signing of an Agreement by the following parties: SNH (Scottish Natural Heritage), JNCC (Joint Nature Conservation Committee), SRSs (Scottish Raptor Study Groups), 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). The SRMS is concerned primarily with the annual monitoring of the abundance, distribution and breeding success of diurnal birds of prey (Accipitriformes and Falconiformes), owls (Strigiformes) and the Common Raven.

Scottish Raptor Study Groups (SRSs)

The SRSs is a consortium of ten regional raptor study groups (Figure 1) with a combined membership of over 230 volunteer and professional ornithologists. Members have extensive expertise in the field study of breeding birds of prey and conduct many of their studies in their own time. They have provided the bulk of the data collated for this report on raptor numbers, distribution and productivity. For more information on the Scottish Raptor Study Groups, see www.scottishraptorgroups.org.

Scottish Raptor Monitoring Group (SRMG)

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

Raptor Breeding Report for 2004

Introduction to breeding report

The species reports that follow are based on the data supplied by the ten regional raptor study groups in Scotland, RSPB Scotland and others, to the Raptor Monitoring Officer for the year 2004. There were initial visits to 3,488 breeding sites and home ranges during the year (Annex 1), similar to the 3483 sites in 2003 (Annex 4). Of these, 2,277 (65%) were occupied by a pair of birds and received further visits to monitor breeding success (Annex 2). Compared with the first reporting year of the Scottish Raptor Monitoring Scheme in 2003 there was a sizable increase in coverage for 13 of the 18 target species in 2004. The Golden Eagle, which was subject to a national breeding survey in 2003, involving visits to more or less all known eagle ranges in Scotland, was the only species for which monitoring effort was reduced. However, the 232 eagle home ranges visited and 151 breeding attempts monitored from a population of 440 pairs was still an impressive achievement. Equally impressive were the samples of nest histories for five other nationally scarce species: Hen Harrier, Northern Goshawk, Merlin, Peregrine

Falcon and Barn Owl. Furthermore, complete or near complete coverage of the Scottish breeding population was achieved for an additional four species: Red Kite, White-tailed Eagle, Marsh Harrier and Osprey; the first two mainly by RSPB Scotland staff. The scarcer raptor species often receive the most attention by raptor study groups and RSPB personnel. Far fewer records are received for commoner species such as Eurasian Sparrowhawk, Common Kestrel and Tawny Owl. Field workers are once again encouraged to submit breeding records for all raptors and owls they come across during the breeding season to help address under-recording. Annex 3 gives the most recent estimate of the Scottish population of each species, with the totals of occupied territories or ranges known to the Scheme, and of breeding pairs reported to the Scheme, to give an indication of the monitoring effort in 2004.

Observer coverage

The areas covered by raptor field workers are not uniform across Scotland. Some species and regions receive more comprehensive coverage than others. In the report, the scale of coverage achieved is indicated on the small maps associated with each species.

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 and Golden Eagle, 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 European 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, Eurasian 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 short. 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 have the appearance of being 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 un-occupied ranges within a study area is accurately recorded, as well as the presence of breeding attempts and any production of young.

Terminology

The terminologies used in this report have the following definitions, based on Hardey *et al.* (2006):

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

Home range - the area that contains the nesting range and the area over which a raptor or a pair of raptors forage. The

entire home range, or a core area known as the nesting territory, may be defended against birds of the same species in the breeding season.

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 home range/nesting territory 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). Sightings and/or signs recorded on more than one visit provide stronger evidence of occupancy.

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; or (b) repairs or builds a nest, or prepares a nest scrape; or (c) lays at least one egg.

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

Nesting success - the proportion 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, which 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 fledged young per breeding pair.

Estimating breeding success: a note of warning

The timing of home range visits may bias estimates of raptor breeding success. Those visits that begin late 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, exasperating the problem. Ideally, all breeding attempts should be monitored from the start of pair formation to either breeding failure or the successful fledging of young. Because of the secretive nature of many raptors and the large areas over which they range, this is not always achievable and breeding attempts that persist for longer are more likely to be detected than those which fail at an early stage. In particular, nests found and examined only at the chick stage will give rise to a strong positive slant on estimations of breeding success because failure is more likely to occur at the pre-lay stage or during incubation. Moreover, it was not always possible to determine from the submitted summary recording forms at what stage in the breeding cycle individual nests were found. It is hoped that a new nest recording spreadsheet introduced at the start of 2005 and now widely adopted by raptor workers will help address this problem.

On some driven grouse-moors of Scotland, recent studies have shown that some raptors that attempt to settle or breed there suffer from human interference (Etheridge *et al.* 1997, 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 were unoccupied because previous inhabitants had 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.

Species Accounts

European Honey-buzzard

Pernis apivorus

A sporadic nesting species in the past, regular breeding by Honey-buzzards was first recorded in the Highlands during the early 1970s (Harvey 2005) and a very small breeding population is now established in Scotland. The species, however, is easily overlooked, even in well-watched areas and is likely to be more widespread and commoner than currently thought. Birds were seen in two areas of the Highlands during the summer months; one nest was located and two young fledged in early August.

Red Kite

Milvus milvus

Following successful re-introductions to the Black Isle (1989-93), west Perthshire (1996-2001) and Galloway (2000-05) a slowly increasing population has become established in Scotland. All breeding attempts are monitored by RSPB and many of the young produced are wing-tagged. 2004 saw a 11% increase for the Scottish Red Kite breeding population with 60 laying pairs rearing a minimum of 115 young (Tables 1 & 2).

Highland

In the early spring, 65 known nesting sites were checked, 40 were occupied (36 pairs and 4 single males). Thirty-five pairs laid a full clutch of eggs and 30 pairs successfully reared 80 young. Most brood sizes were two or three (Table 2). The first nesting attempt of one of the successful pairs failed when the nest collapsed due to high winds soon after the start of incubation. Undeterred, they built a completely new nest in an adjacent tree and reared a late brood of two young. This is the first recorded incident of a successful replacement clutch since the start of the re-introduction in 1989.

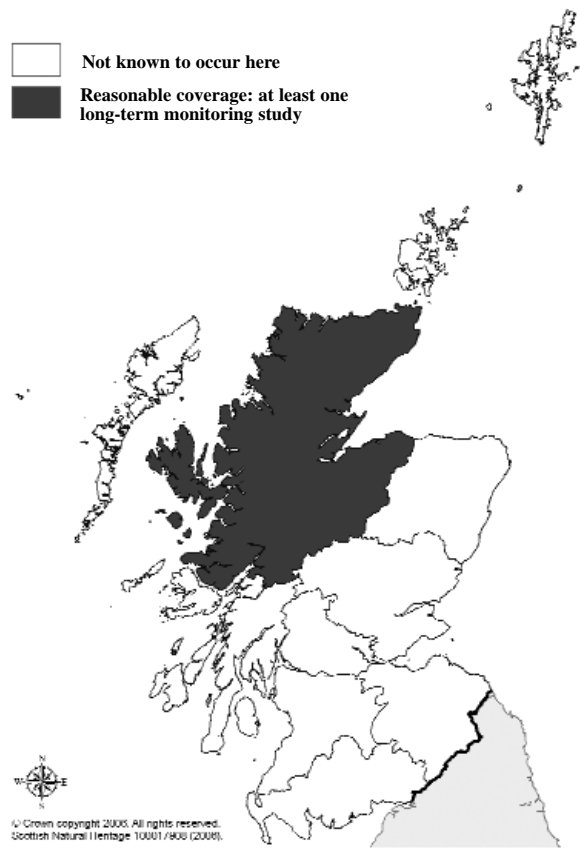
For the second successive year, there was no increase in this breeding population, despite excellent productivity over the previous three years, the highest of any UK Red Kite population. As they are essentially scavengers, kites are especially vulnerable to illegally poisoned bait. As highlighted in the last report, persecution remains a major constraint to the growth and spread of Red Kites in northern Scotland.

Central & Tayside

Pairs established in this area are derived from the second re-introduction scheme that occurred near Doune in west Perthshire between 1996 and 2001. Twenty-four occupied territories were identified in 2004, six in Tayside and 18 in Central (a single male held one of these territories). There was no known increase in the geographical spread of the kites this year with new territories infilling between known breeding sites in Tayside and Central.

Central

An increase from 13 to 16 breeding pairs occurred, the first since 2002. However, four pairs failed during incubation and productivity of the 12 successful pairs (Table 2) was reduced, possibly by localised heavy rain in mid May and June, so that only 19 young fledged, the same number as 2003. The resultant productivity in 2004 was below the long-term mean productivity recorded to date.



Level of coverage of: Honey Buzzard



Level of coverage of: Red Kite

Table 1: Breeding Success of the Red Kite population in Scotland, 2004.

Region	Home ranges checked	Pairs located	Single birds holding territory	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Highland	65	36	4	35	33	30	80
Tayside	7	6	0	6	5	5	13
Central Scotland	24	17	1	16	12	12	19
Dumfries & Galloway	8	5	2	3	3	2	3
Total	104	64	7	60	53	49	115

Table 2: Brood size at fledging and productivity of Red Kites in Scotland, 2004.

Region	Pairs laying eggs	Number of successful broods	Brood size 1	Brood size 2	Brood size 3	Brood size 4	Total young	Mean brood size per laying pair	Mean brood per successful pair
Highland	35	30		11	18	1	80	2.3	2.7
Tayside	6	5	1	1	2	1	13	2.2	2.6
Central Scotland	16	12	7	3	2		19	1.2	1.6
Dumfries & Galloway	3	2	1	1			3	1.0	1.5

Tayside

Six breeding pairs were located, one more than last year. Five bred successfully rearing 13 young, down on the 15 reared in 2003, but still high productivity (Table 2).

Dumfries & Galloway

A further 10 young birds were taken from the extensive population established in the Chilterns. They were released at two locations close to Loch Ken in Galloway in late July. This brought the number of kites released in the area over the last four years to 100. Seven occupied kite territories were found in the spring. This included a non-breeding first-year pair and two females without fixed mates. Three nests were found with eggs (clutches 2, 2 and 3). All three nests hatched young but one failed at an early stage. There were two successful broods of one and two chicks.

White-tailed Eagle

Haliaeetus albicilla

The monitoring of this species continues to be organised by the RSPB and funded by SNH (Grant 2005). The gradual increase in the number of breeding pairs of this spectacular sea-eagle was maintained in 2004 (Table 3), but nesting success was down on the previous year and fewer young reached fledging mainly due to a reduction in number of broods with two young.

Thirty-two occupied territories were located. Twenty-eight pairs were confirmed as laying eggs but there were many failures and only 15 pairs were successful in rearing 19 young. There were 11 broods with single chicks and four broods with two.



Level of coverage of: White tailed Eagle

Table 3: White-tailed Eagle breeding success and productivity in Scotland, 1995-2004.

(from Grant 2005)

Year	Areas occupied	Territorial pairs	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Total young fledged	Young fledged per pair laying	Young fledged per territorial pair
1995	12	11	10	6	5	7	0.70	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
2004	32	32	28	19	15	19	0.68	0.59

Eurasian Marsh Harrier

Circus aeruginosus

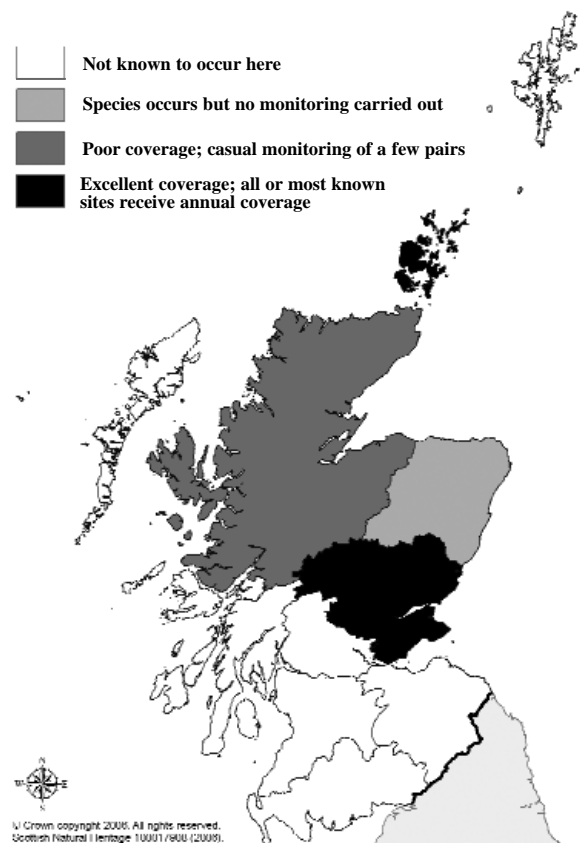
A small increase in the Scottish population occurred in 2004 with eight pairs located in the breeding season (Table 4, overleaf). An inland location in Tayside was again occupied and two young were reared. Two summering pairs in Northeast Scotland were recorded but breeding was not confirmed. The stronghold with three pairs is still the Tay estuary, site of the most extensive reed bed in Britain. Overall, five successful pairs reared 15 young, only slightly down on the 2003 figure.

Hen Harrier

Circus cyaneus

Following national surveys in 1988-89 (Bibby & Etheridge 1993) and 1998 (Sim *et al.* 2001), a third national survey was carried out in 2004 (Sim *et al.* in press). In the latest survey, an estimated 633 territorial pairs were located in Scotland, a 32% increase over the 1998 estimate. Scotland now holds 79% of the UK and Isle of Man population. Increased search effort in support of this survey resulted in a >20% increase in the number of home ranges checked, located and monitored in 2004 over that in 2003. Note that the national survey figures are based on extrapolation whereas this report includes details of all breeding attempts reported to the SRMS.

Two factors are likely to have assisted the settlement of Hen Harrier pairs and their nesting success during the year. The first was warm settled weather on the breeding grounds in early spring and for long periods during the summer. The second was a peak in the vole population cycle reported from several widespread studies. This had a positive effect not only on harriers but also Kestrels, Barn and Short-eared Owls. Based on data submitted under the SRMS, there were 457 home ranges checked in 2004 (Table 5) and territorial pairs occupied 417 (91%). Follow up visits were carried out at 359 (86%) of these occupied home ranges and nests with eggs were found at 326 (91%). Of these, 219 (67%) were successful with 630 fledged young, giving a mean of 1.8 young per monitored occupied



Level of coverage of: Marsh Harrier

Table 4: Breeding success of Marsh Harriers in Scotland, 2004.

Region	Pairs located	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Orkney	1	1	1	2
Highland	1	0	0	0
Northeast Scotland	2	0	0	0
Tay reed beds	3	3	3	11
Tayside inland	1	1	1	2
Total	8	5	5	15

Table 5: Breeding success of Hen Harriers in Scotland, 2004.

Area	Home ranges checked	Home ranges occupied	Occupied home ranges monitored	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Orkney	75	74	74	67	33	68
Benbecula, North & South Uist	40	34	22	22	21	60
Isles of Skye and Eigg	17	11	11	11	9	28
Hebrides total	57	45	33	33	30	88
Caithness	7	7	7	7	3	12
Sutherland	24	19	18	15	11	41
Ross-shire	4	3	2	2	2	8
Inverness-shire	2	2	2	2	2	8
North Highlands Total	37	31	29	26	18	69
Moray & Nairn	14	11	10	9	8	24
Aberdeenshire	14	14	13	7	4	14
Angus	5	4	4	2	1	5
Perthshire	27	25	21	21	18	62
East Highlands Total	60	54	48	39	31	105
Central Scotland	13	10	10	8	5	12
Argyll mainland	19	18	14	14	7	19
Isle of Mull	31	31	15	15	10	21
Isle of Bute	4	4	3	3	3	9
Isle of Islay	43	42	31	29	26	58
Isle of Arran	35	35	33	33	27	83
West Highlands and islands Total	145	140	106	102	78	202
South Strathclyde	52	48	48	41	19	69
Lothian & Borders	10	5	4	4	4	14
Dumfries & Galloway	21	18	17	14	6	15
Southwest and Southern Uplands Total	83	73	69	59	29	98
GRAND TOTAL	457	417	359	326	219	630

home range (1.7 in 2003). As found in the national survey (Sim *et al.* in press), there were regional differences in the species abundance and productivity, due in part to the effect of land use and moorland management.

Regional reporting of data submitted to SRMS below is based on the Scottish Regions defined in the published reports of the three national surveys of 1988/89, 1998 and 2004, rather than by SRSR area (Figure 2). Figure 3 (inside back cover) shows the distribution of census squares and squares where Hen Harriers were located in the 2004 census.

Orkney

A run of mild springs in recent years has assisted the recovery of this important population along with initiatives implemented to improve the foraging habitat through the Orkney Hen Harrier Scheme and the Rural Stewardship Scheme. The archipelago now holds over 12% of the Scottish Hen Harrier breeding total. Total coverage of the known Hen Harrier range in Orkney was achieved during the survey. Seventy-four home ranges were found occupied and active nests were found at 67. Nesting success at 49% remains low compared to most other regions though this was an improvement on both 2003 (39%) and 2002 (43%). Mean brood size was 0.9 young per occupied home range monitored.

Hebrides

A pair was located during the breeding season on Barvas Moor, Lewis but was not followed up. If nesting occurred, it would have been the first confirmed breeding on the island. Elsewhere, there was increased coverage in North and South Uist and Benbecula in 2004. Forty home ranges were checked and 34 (85%) were occupied. Twenty-two ranges were monitored and found to have a nest with eggs and 21 were successful. At 95%, this nesting success was very high and with 60 fledged young, the productivity was equally impressive. In the Inner Hebrides, a pair again bred on Eigg and reared four young. Improved coverage on Skye located ten breeding pairs; eight successfully reared a minimum of 24 young. Mean brood size for the region was 2.7 young per occupied home range monitored.

North Highlands

The majority of nests monitored were on moorland not managed for driven grouse. Thirty-seven home ranges were checked and of these, 31 were occupied by a territorial pair of harriers. Twenty-nine received follow up visits and active nests were found at 26. Eighteen nests were successful (69%), fledging a minimum of 69 young; a mean brood size of 2.4 young per occupied home range monitored.

East Highlands

Sixty known home ranges were checked. Pairs of Hen Harriers were found at 54. Forty-eight home ranges received follow up visits and nests with eggs found at 39 (81%). There were 31 (82%) successful nests raising a minimum of 105 young. Mean brood size per occupied home range monitored was 2.2 young.

West Highlands and islands

In 2004, this region held the highest proportion (41%) of the Scottish breeding population of Hen Harriers (Sim *et al.* in press). Occupation of home ranges was high with 140 (97%) of 145 checked having pairs present. Monitoring visits were carried out at 106 occupied home ranges and an active nest with eggs was located at 102. Of these 78 (76%) were successful in rearing 202 young. Mean brood size was 1.9 young per occupied home range monitored.

Southwest and the Southern Uplands

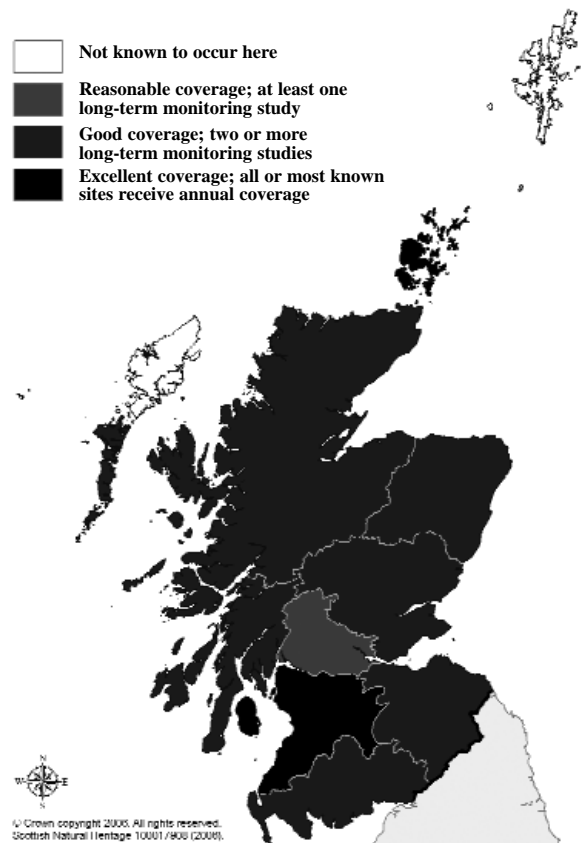
As in 2003, this region received excellent coverage and it is believed that most of the breeding population was located. Seventy-three territorial pairs were found and 59 active nests were located at the 69 occupied ranges that were monitored. Only 29 (49%) nests produced fledged young, the same proportion as in 2003. The 98 young that fledged give a mean brood size of 1.4 young per monitored occupied home range.

Northern Goshawk

Accipiter gentilis

The initial colonisation of Scotland during the early 1970s was almost certainly due to the deliberate release of falconers' birds (Marquiss & Newton 1981). Despite an initial increase in several regions, Goshawks remain a scarce breeding species throughout much of Scotland. Only in the northeast and in regions south of the central belt are there reasonable numbers of breeding pairs. Elsewhere, their populations are small, fragmented and difficult to locate. The number of monitored pairs has remained unchanged over the past three years despite greater effort, suggesting that this forest nesting species is no longer increasing. In Scotland, there is a lot of vacant habitat and an abundance of suitable sized prey such as rabbits, pigeons, crows and game birds for Goshawks to exploit.

On average, Goshawk pairs are found to occupy two out of every three known home ranges each spring. To the experienced observer, the presence of Goshawks in woodland can be obvious, through their distinctive plucks and calls. Locating an active nest, particularly in the larger forests, is time consuming



Level of coverage of: Hen Harrier

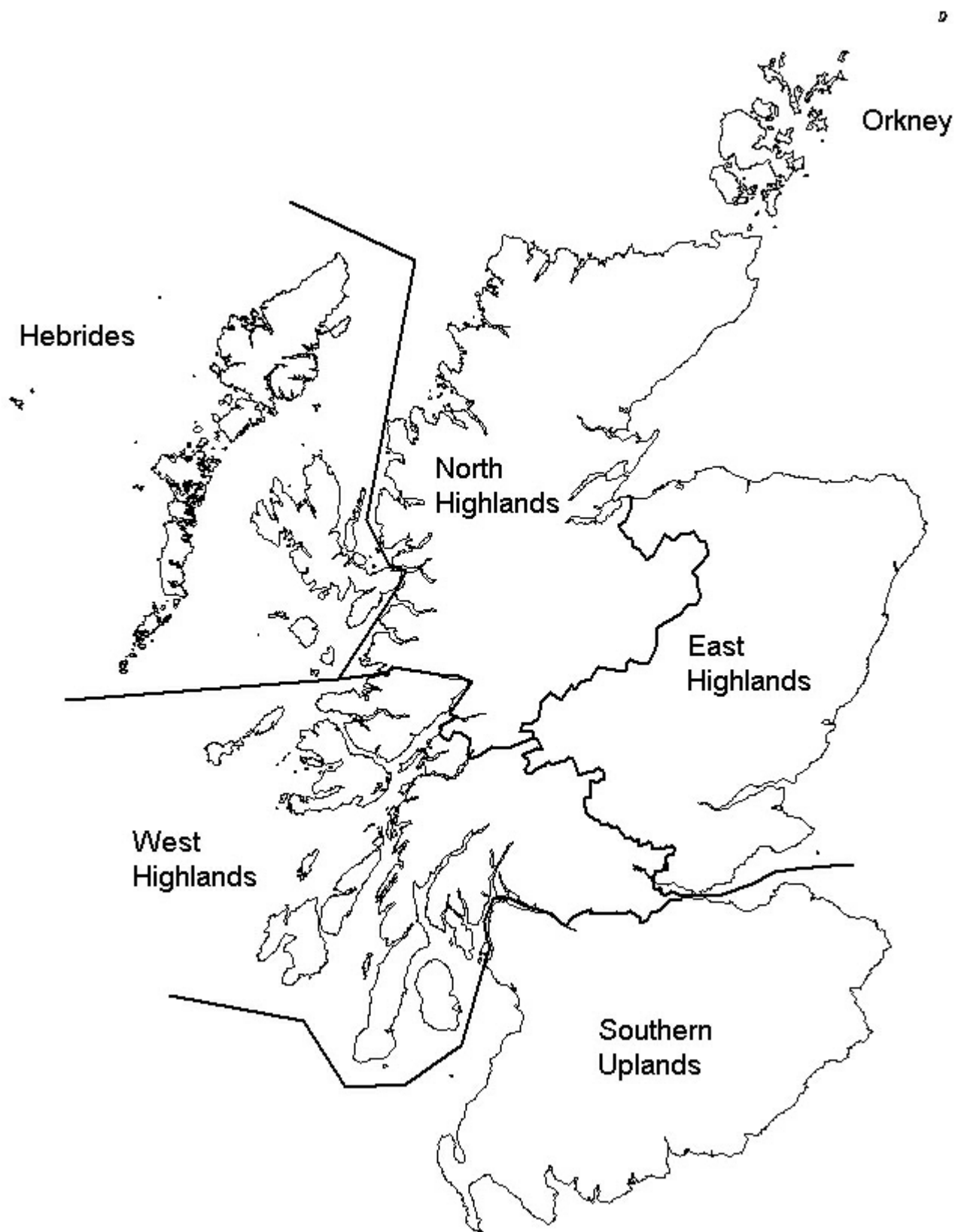


Figure 2: Location of the regions used to summarise Hen Harrier breeding data in this report and in the 1988/89, 1998 and 2004 national surveys (from Sim *et al.* in press).

Table 6: Breeding success of Northern Goshawks in Scotland, 2004.

Region	Home ranges checked	Home ranges occupied	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Highland	11	6	6	6	6
Northeast Scotland	34	23	22	21	46
Tayside	6	2	2	2	3
South Strathclyde	3	2	-	-	-
Lothian & Borders	57	40	26	22	49
Dumfries and Galloway	21	13	11	9	22
TOTAL	132	86	67	60	126

and never easy, leading to under-recording. This is caused by a tendency for some pairs to move their nest site when subjected to regular monitoring visits over time (M. Marquiss pers.comm.). Breeding success in 2004 was again high with 90% of nests with eggs producing young. The mean brood size of 1.9 young per laying pair is a minimum figure, as several broods were not fully counted.

Highland

There was increased effort by Forestry Commission rangers in 2004 to record this species. The six active territories located were all successful. To minimise disturbance, no brood counts were carried out.

Northeast Scotland

Twenty-three home ranges were found occupied in one long-term study, the same number as 2003. Breeding success was very high (95%), with only a single nesting failure amongst the 22 nests which contained eggs. Forty-six young fledged, giving a mean brood size of 2.1 per laying pair.

Tayside

Six home ranges were checked but only two nesting pairs located. Both were successful with one nest producing two young whilst at the other the number was unknown.

South Strathclyde

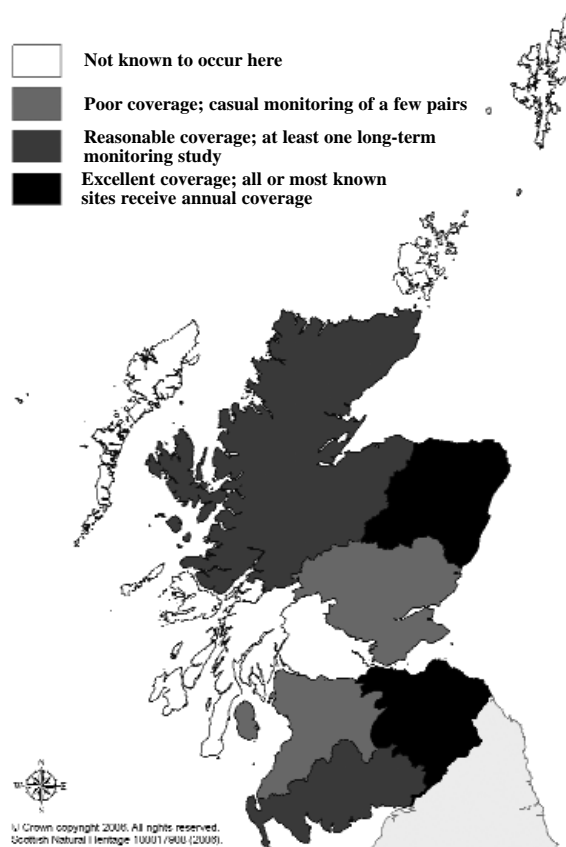
Birds were present at two of the three home ranges checked. However, no follow-up visits were carried out to check for any breeding attempt.

Lothian & Borders

One long-term study centred in the Borders is ongoing. Fifty-seven known home ranges were checked and 40 (the same number as 2003) were found occupied. Nests with eggs were found at 26 and at 22 nests (85%), young successfully fledged. The 49 young reared give a mean brood size of 1.9 per laying pair.

Dumfries & Galloway

Thirteen home ranges were found occupied and 11 active nests were monitored. Nine (82%) produced 22 fledged young. Mean brood size was 2.0 per laying pair.



Level of coverage of: Goshawk

Table 7: Breeding Success of Eurasian Sparrowhawks in Scotland, 2004.

Region	Home ranges checked	Home ranges occupied	Breeding attempts monitored	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Orkney	5	5	5	5	3	4
Uist	2	2	0	-	-	-
Highland	4	4	3	3	2	8
Tayside	3	3	3	3	3	8
Central Scotland	1	1	1	1	1	3
Argyll	15	15	12	12	11	20
South Strathclyde	41	27	19	19	15	54
Lothian & Borders	1	1	1	1	0	0
TOTAL	72	58	44	44	35	97

Eurasian Sparrowhawk

Accipiter nisus

Sparrowhawks are widespread throughout Scotland except in the Western and Northern Isles. As a predator specialising in small birds, their abundance and breeding success are excellent indicators of the health of the environment. There is currently only one long-term study in Scotland.

Orkney

Breeding pairs were located at all five home ranges checked (Table 7). Three were successful, producing broods of two, one and an unknown size.

Uist

Birds were present in suitable habitat at two locations but no nests were found at either.

Highland

Three active nests were monitored. Two were successful rearing broods of three and five.

Tayside

Three monitored pairs raised eight young.

Central

A single monitored nest produced three young.

Argyll

Fifteen occupied home ranges were located. Twelve nests were found and monitored. There was only a single failure. Four of the broods fledged 11 young giving an average of 2.8 young per nest. A further seven nests produced a minimum of nine young but the brood sizes were not accurately counted. These figures suggest that the 11 successful pairs could have produced an estimated 30 young.

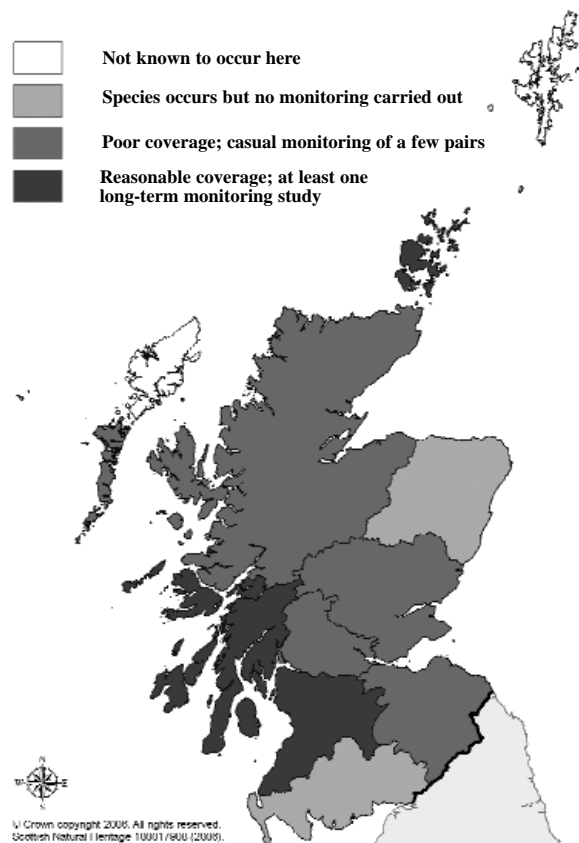
South Strathclyde

Forty-one known home ranges were checked as part of a long-term breeding study in east Ayrshire. Evidence of occupation was found at 27 (66%). Twenty-one nests were found but two were inaccessible and their outcome was not known. Mean clutch size at 14 nests was 4.7. There were four failures, all at the pre-egg or egg stage. Fifteen successful pairs produced a minimum of 54 young. The sex ratio of 53 young ringed was

23 males (43.5%) and 30 females (56.5%), the same ratio as 2003.

Lothian & Borders

A pair laid eggs in the only monitored nest, but failed to fledge any young.



Level of coverage of: Sparrowhawk

Table 8: Breeding Success of Common Buzzards in Scotland, 2004.

Region	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Orkney	3	2	3
Uist	8	8	16
Highland			
- Skye	9	8	22
- Canna	2	1	2
- Eigg	7	7	13
- Sutherland	15	12	28
- Easter Ross	52	39	76
- Black Isle	7	5	15
- Badenoch	10	8	21
- Inverness	2	2	5
Highland total	104	82	182
Fife	15	15	26
Central Scotland			
- Stirling and west Perth	28	24	56
- Falkirk	3	3	7
Central Scotland total	31	27	63
Argyll			
- Coll	5	4	8
- Tiree	7	6	6
- Colonsay	10	9	20
- Islay	10	10	17
- Bute	27	24	51
- Mainland	11	9	13
Argyll total	70	62	115
Lothian & Borders	41	37	87
Dumfries & Galloway	7	7	13
GRAND TOTAL	279	240	505

Common Buzzard

Buteo buteo

In the last decade, Buzzards have undergone a noticeable expansion in range and the species is now occurring in areas where it has not been seen for 200 years. A more up to date estimate of the current breeding population is urgently required.

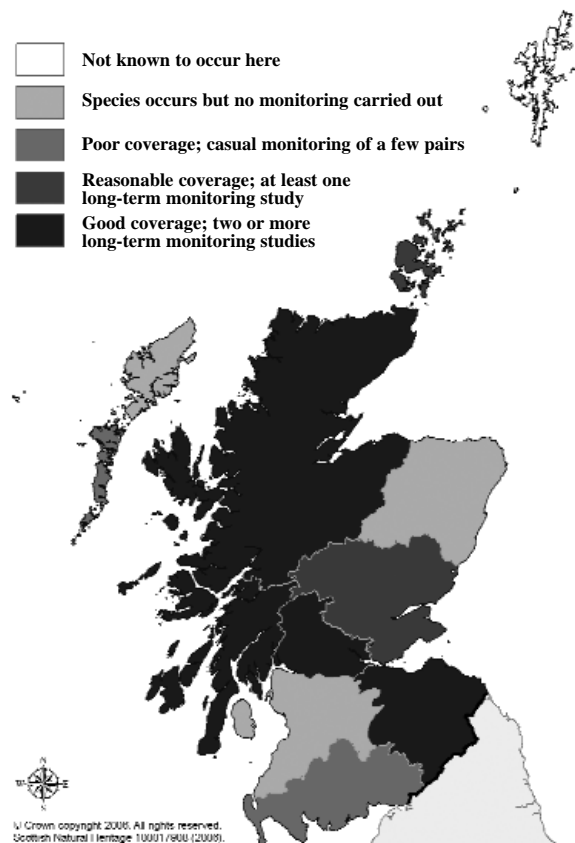
Following a successful year in 2003, results from across the country suggest that Buzzards enjoyed another good breeding season in 2004 (Table 8). The number of nests with eggs that produced fledged young was 86% (85% in 2003) and the mean fledged brood size per laying pair was 1.8 (1.8 in 2003). The Buzzard is probably the most familiar of all diurnal raptors but is a challenging and rewarding species, particularly against the background of range expansion and population increase. Reporting has improved since 2003 and it is hoped that this trend continues, particularly in those areas where coverage is poor.

Orkney

Common Buzzards have not yet been proved to breed on Mainland. All three pairs monitored were on Hoy where a few pairs have nested since the early 1960s (Berry 2000). Two pairs bred successfully in 2004. One pair produced two young and the other reared at least one, possibly more.

Uist

Eight successful nests were monitored, producing two broods with single chicks, four with two and two with three.



Level of coverage of: Buzzard

Highland

Good coverage for this species was achieved throughout the region. Breeding success was high with 82 of 104 nests (79%) with eggs producing fledged young. The mean brood size was 1.7 young per monitored breeding attempt. This includes data from a long-term study in the Tain area of Easter Ross. Results from this study probably provide accurate and precise figures because of the intensive field methods employed, but may not necessarily be representative of the whole Buzzard population in the region. Seventy known home ranges were checked in the spring and pairs were present at 56 (80%). Fifty-four pairs were monitored and 48 (89%) laid eggs. There were 13 breeding failures with 35 (73%) pairs producing 69 young. Mean brood size was 1.3 young per monitored breeding attempt or 1.4 per laying pair.

Tayside/Fife

Fife does not have a separate Raptor Study Group; the region is monitored by members of the Tayside group. Currently, Buzzards are still colonising the region, particularly in the more cultivated farmland in the east. Fifteen breeding attempts were monitored and they were all successful, producing 26 young, a mean of 1.7 per breeding pair. Brood sizes tended to be smaller than elsewhere, there was only one nest with three young, and the rest were of singletons or twos.

Central Scotland

There is one comprehensive study in the Doune/Callander/Stirling area. Twenty-eight nests with clutches were monitored and 24 (86%) were successful with 56 young reared. Mean brood size per laying pair was 2.0 young.

Argyll

Buzzards are widespread and common throughout the west Highlands and islands. Seventy nests with eggs were monitored. Sixty-two nests (89%) were successful and 115 fledged young were counted. The mean brood size per laying pair was 1.6.

Lothian and Borders

A sample of 41 nests with eggs were monitored in the region. At least 37 (90%) nests were successful in rearing 87 young. This gives a mean brood size of 2.1 young per laying pair.

Dumfries and Galloway

Seven occupied nests with eggs were checked for nesting success. There were no failures and 13 fledged young were produced.

Golden Eagle

Aquila chrysaetos

Following the national survey in 2003, there was reduced effort in monitoring this species in 2004. Nevertheless, 232 (33%) of the 697 known home ranges surveyed in 2003 were checked again in 2004 and 194 (84%) were occupied (Table 9). Adult pairs were found at 166 home ranges. In addition, pairs where one or both birds were in immature plumage were present at nine home ranges and single birds, the majority immature, were at 19. Follow up visits were carried out at 151 home ranges and eggs were confirmed as being laid at 109 (72%). However, this is the minimum figure, as it was believed that some pairs might have laid but failed before recording began.

Hatching occurred at 87 nests (80% of those where laying occurred) and chicks fledged from 81 (74%). Ninety-seven chicks fledged; single chicks were reared at 65 nests (80%) and two chicks were reared at 16 (20%). The mean brood size was 0.64 young per home range occupied by an adult pair. Failure to lay eggs (42) or failure during incubation (22) were the main causes of unsuccessful breeding.

Uist

Twenty-three home ranges were occupied and 14 with adult pairs were monitored. Eggs were laid in 12 nests and eight were successful rearing eight young. Emaciated dead chicks were

Table 9: Breeding Success of Golden Eagles in Scotland, 2004.

Region	Home ranges checked	Home ranges occupied	Home ranges monitored	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Uist	24	23*	14	12	10	8	8
Highland & Moray	82	67**	49	32	24	23	29
Northeast Scotland	23	18 [†]	16	12	9	9	12
Tayside	24	17 [‡]	9	8	8	8	12
Central Scotland	7	7	7	6	3	3	3
Argyll	65	57 [§]	51	38	32	29	32
Lothian & Borders	2	2	2	1	1	1	1
Dumfries & Galloway	5	3	3	?	?	0	0
TOTAL	232	194[¶]	151	109	87	81	97

* Including 2 immature pairs and 2 single birds. **Including 2 immature pairs and 8 single birds. [†] Including 2 single birds. [‡] Including 1 immature pair and 3 single birds. [§] Including 4 immature pairs and 4 single birds. [¶] Including 9 immature pairs and 19 single birds.

found below two eyries suggesting food shortage was a problem in some home ranges.

Highland

In this huge study area, 82 home ranges were checked and 67 showed signs of occupation. Forty-nine home ranges were monitored and at 32, there were clutches of eggs laid. Twenty-three pairs were successful, rearing 29 young.

Northeast Scotland

Almost complete coverage of known home ranges was achieved in this region with 18 of the 23 checked showing signs of occupation. Single birds occupied two of these ranges. The 16 with pairs received follow up visits and eggs were laid at 12. Pairs in nine home ranges hatched and reared 12 young.

Tayside

Of 24 home ranges checked, 17 were occupied, 13 by adult pairs. Nine home ranges received follow-up visits and at eight of these, a clutch of eggs was laid. All eight were successful and 12 young fledged.

Central

Seven home ranges were checked and all were occupied by adult pairs. Egg-laying was confirmed at six home ranges and three pairs were successful in rearing three young.

Argyll and Islands

Excellent coverage was achieved in this region with 65 home ranges receiving a visit. Fifty-seven were occupied, 49 of them by adult pairs. Monitoring visits were carried out at 51 ranges and eggs were confirmed at 38. There were 29 successful nests rearing 32 young.

Lothian and Borders

Currently the Golden Eagle is a very rare breeding species in this region. Two home ranges were occupied and one pair successfully reared a single chick.

Dumfries and Galloway

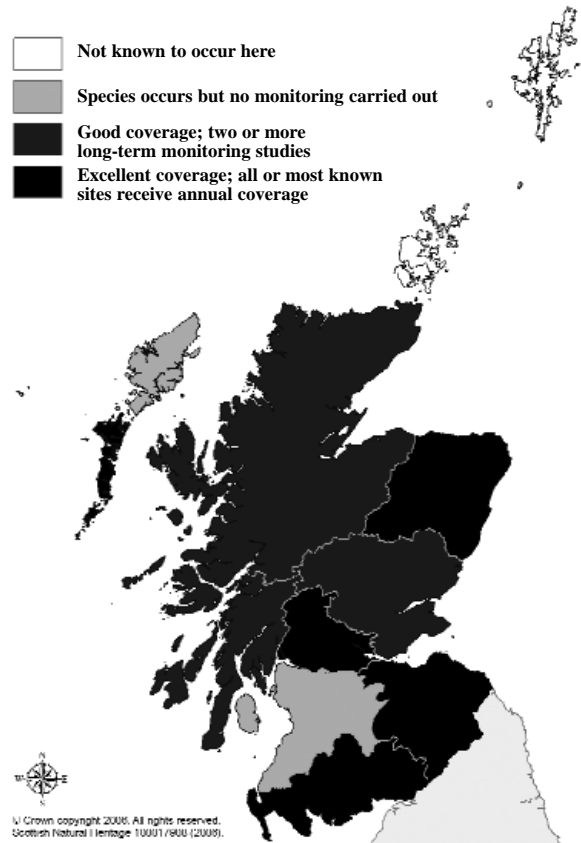
The species appears to be close to extinction in Dumfries and Galloway after a disappointing year. Five home ranges were checked and birds were present at three of them. Of these, two showed no evidence of freshly built-up nests and the evidence was inconclusive at the third one. No eggs were confirmed as laid and no young were reared.

Osprey

Pandion haliaetus

The natural re-colonisation of Scotland by Ospreys in 1954 and subsequent growth in population was one of the exciting avian events in the latter half of the 20th century. The success story continued with a further increase in 2004 in both population and range (Table 10, overleaf). There are still extensive areas of suitable habitat in the Borders and in Galloway without Ospreys. Furthermore, should Ospreys ever repeat their ancestral habit of nesting on rock islets in lochs, the tree-less landscape of the northwest Highlands and the Hebrides is ripe for colonisation.

The 182 pairs found at known nest sites in 2004 (Table 11) was a 12.3% increase on the 2003 figure. At least 155 pairs laid eggs (10.7% increase) and 114 pairs (4.6% increase) were successful in rearing young. All of the increase occurred in the two main breeding areas of Highland and Tayside. There was no change in



Level of coverage of: Golden Eagle



Level of coverage of: Osprey

Table 10: Population and nesting successes of Ospreys in Scotland, 1995-2004 (from Dennis 2005).

Year	Pairs present at nests	Pairs laying eggs	Pairs fledging young	Total young
1995	99	92	73	146
1996	104	93	74	155
1997	111	102	77	159
1998	130	116	92	193
1999	136	125	87	183
2000	147	121	-	195
2001	153	135	104	219
2002	158	128	104	213
2003	162	140	109	229
2004	182	155	114	233

Table 11: Breeding success of Ospreys in Scotland, 2004.

Region	Nest sites checked	Pairs present	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Highland	120	81	74	54	110
Northeast Scotland	18	18	18	13	26
Tayside	59	57	40	27	56
Central Scotland	16	14	12	10	20
Argyll	9	8	7	6	12
Lothian & Borders	7	3	3	3	7
Dumfries & Galloway	1	1	1	1	2
TOTAL	230	182	155	114	233

the other six regions. During May and through to early July there were localised periods of prolonged and heavy rain. This unsettled weather may have caused the failure of a number of breeding pairs, particularly those with small young. Nevertheless, the 233 young that fledged, whilst only four more than 2003, made 2004 the most successful year since re-colonisation. The population in Scotland is now at its highest level ever in modern times.

Highland & Moray

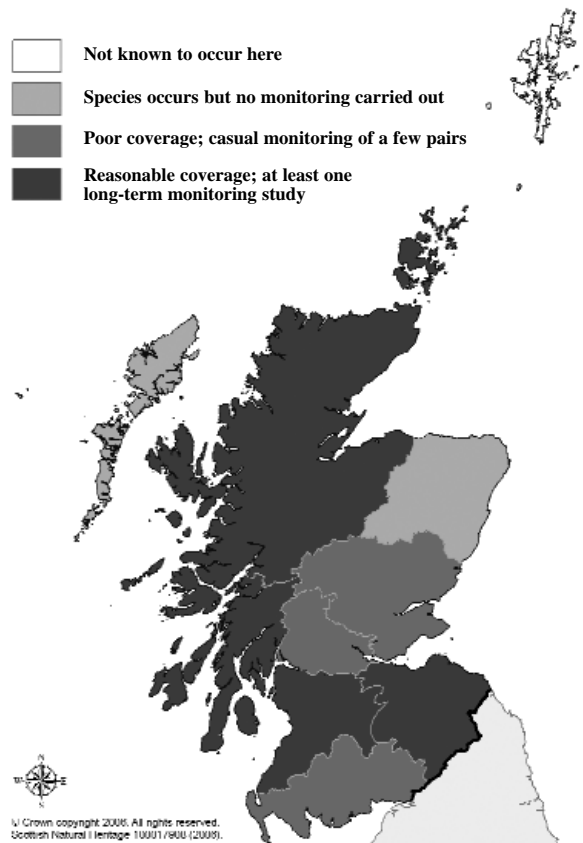
Since the first pair at Loch Garten fifty years ago, the Highlands have always held the majority of the Scottish Osprey population. In 2004, this stood at 81 pairs (45%). All apart from three pairs are in close proximity to the eastern firths and glens, with colonisation of the far north and the western seaboard only just beginning. Seventy-four pairs laid eggs and 54 (73%) were successful in rearing 110 young.

Northeast Scotland

There was no change in the Aberdeenshire population, which remained at 18 pairs. Heavy rain during the chick period reduced breeding success and there were 13 broods fledging 26 young, both down on last year (15 broods, 31 young).

Tayside

The population growth continued with 57 nest sites occupied by pairs in the spring (45 in 2003). However, many pairs did not appear to lay eggs and clutches were confirmed at only 40 sites (two more than 2003). Prolonged rain caused the total nesting failure of ten pairs and the adverse weather reduced the size of broods at successful nests. The 56 young fledged was four less than 2003. Four pairs again nested successfully on electricity pylons.



Level of coverage of: Kestrel

Table 12: Breeding success of Common Kestrels in Scotland, 2004.

Region	Breeding sites checked	Breeding sites occupied	Breeding attempts monitored	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Orkney	-	13	13	13	11	9	31
Highland	-	23	20	20	18	17	60
Tayside	-	9	4	4	4	4	13
Central Scotland	-	2	2	2	2	2	5
Argyll	-	14	10	10	7	6	17
South Strathclyde	33	28	26	24	23	23	109
Lothian & Borders	-	35	32	30	27	23	98
Dumfries & Galloway	-	3	3	3	3	3	5
TOTAL	-	127	110	106	95	87	338

Table 13: Clutch and brood size of Common Kestrels in two study areas in south Scotland, 2004.

Study area	number of eggs					mean clutch size	number of young							mean brood size
	3	4	5	6	7		0	2	3	4	5	6	7	
South Ayrshire	0	1	11	11	1	5.5	1	1	1	6	10	4	1	4.4
Pentland Hills	2	3	10	8	1	5.1	7	0	3	8	6	2	0	3.2

* A deserted clutch of 1 egg has been excluded

Central

There were 12 egg-laying pairs again in this region in 2004. The success of ten of these pairs (one more than 2003) was marred by smaller brood size and reduced productivity compared to 2003. Twenty young successfully fledged (23 in 2003).

Argyll

There was no increase in the seven breeding pairs occurring in Argyll nor in the number of successful pairs (6), which remained the same as 2003. However, there was a rise in productivity and 12 young were reared.

Lothian & Borders and Dumfries & Galloway

No change in the breeding population in 2004. Four pairs again bred south of the central lowlands. All four were successful, rearing nine young.

Common Kestrel

Falco tinnunculus

There was almost a 100% increase in the reporting of this species in 2004 compared with 2003 (Table 12, overleaf). This was partly due to a peak in vole numbers resulting in more pairs attempting to breed, and partly due to an increased effort by study groups to record this species. There are currently three long-term Kestrel studies in Scotland; Orkney, Lothian & Borders (Pentland Hills) and South Strathclyde (Ayrshire).

Orkney

There were 13 breeding attempts on Orkney, nine were successful and 31 young were reared. Mean brood size was 2.4 young per laying pair or 3.4 per successful pair.

Highland

Twenty breeding attempts were monitored in 2004. Seventeen were successful in rearing 60 young. Mean brood size was 3.0 per laying pair or 3.5 per successful pair.

Tayside

A small sample of four breeding pairs was monitored in Tayside during 2004. All four were successful rearing 13 young.

Central

Two pairs reared broods of two and three young.

Argyll

A total of ten breeding attempts was monitored, five on Islay, one on Coll and four on the mainland. Six successful nests produced 17 young, giving an average of 2.8 per brood or 1.7 young per laying pair. These figures suggest that Kestrels in this region in 2004 were not nearly so successful as elsewhere.

South Strathclyde

Driven by a 3-year peak in vole abundance, Kestrels in the Ayrshire study area had an extremely productive breeding

season. Territory occupation was high at 85% and, with only one breeding failure amongst the 24 pairs that laid full clutches, hatching and fledging success (96%) was at an equally high level: 109 young fledged from 23 nests. Mean brood size per laying pair was 4.4 and 4.7 per successful pair (Table 13).

Lothian & Borders

In the Pentland Hills study, vole numbers were described as “at plague proportions”. Thirty-one sites were occupied early in the season (February - March). The availability of suitable places to nest appears to have been a limiting factor as Kestrels or Long-eared Owls occupied all those checked. Territorial disputes between Kestrels occurred well into the breeding season and Long-eared Owl pairs displaced two Kestrel pairs from their nesting baskets. These activities depressed breeding success compared with the Ayrshire study. There were 26 confirmed breeding attempts and 19 were successful, rearing 83 young. The mean brood size per laying pair was 3.2 or 4.4 per successful pair (Table 13). Elsewhere in Lothian, four pairs successfully reared 15 young.

Dumfries & Galloway

Details of three successful breeding attempts were received. There were no accurate brood counts and the five young counted was a minimum figure.

Merlin

Falco columbarius

The Merlin receives good coverage over most of Scotland. In 2004, 403 home ranges were checked for occupation and 254 (63%) were occupied (Table 14). This compares with an identical 63% occupation rate in 2003. Clutches of eggs were laid at 175 monitored home ranges and 135 (77%) reached the hatching stage. There were 115 successful nests (65% of clutches laid), fledging a minimum of 319 young. A number of broods could not be counted and were estimated from the maximum count of fledglings made on the final visit, often as low as 1+ young. Mean brood sizes were 2.8 young per successful pair and 1.8 per laying pair. These figures for breeding success are lower than the equivalent obtained in 2003. Observers attributed many failures to heavy rainfall that occurred on a few days in June. Nestlings, sometimes well-feathered young, and often the whole brood, were found dead from presumed hypothermia.

Shetland

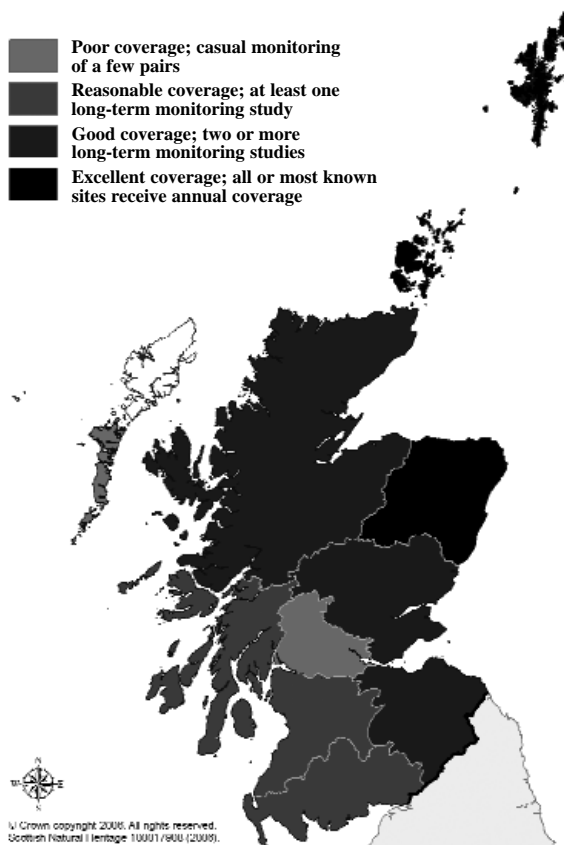
Twenty home ranges were checked for occupation and seven pairs were located. Four were successful in rearing nine young.

Orkney

A second year of decline in the nesting success of the Orkney Merlin population occurred in 2004. There were 17 monitored breeding attempts but low hatching success (11 nests; 64%), fledging success and brood size resulted in only 21 young fledging from 9 nests. Productivity was a disappointing 1.2 young per laying pair.

Highland

There are two long-term studies in the region; north Sutherland and west Moray and Nairn. Both recorded reduced breeding success in 2004, this being particularly pronounced at the latter. In Sutherland, 57 home ranges were checked and 45 were occupied. The fate of fifteen clutches was followed and only eight (53%) were successful rearing 22 young. Mean brood size



Level of coverage of: Merlin

per laying pair was 1.5. In west Moray and Nairn, 23 home ranges were checked. Nine ranges (39%) were occupied by breeding pairs but only three pairs (33%) successfully reared eight young. Mean brood size was a very low 0.9 young per laying pair. The corresponding figures for 2003, ten laying pairs producing 27 young, show how poor breeding success was in 2004. The sample sizes elsewhere in Highland are too small to be individually meaningful. Combined figures are 17 home ranges checked and 13 occupied. Ten laying pairs were monitored, eight producing 23 young.

Northeast Scotland

Four intensive study areas in this region again received coverage. One hundred and three home ranges were checked, the same number as in 2003. Pairs were present at 48 (52 in 2003) and 45 nests were monitored (50 in 2003). Thirty-one pairs (69%) hatched eggs and 28 (62%) succeeded in rearing at least 80 young. Mean brood size was 1.8 young per laying pair. Compared with 2003, home range occupancy was down 8%, breeding success was down 21% and productivity was down 37%. Looking at the individual study areas, mid/upper Deeside was slightly down on 2003, whilst the other three were greatly depressed, particularly lower Deeside and east Moray.

Tayside

Two study areas are active in Tayside. The 44 home ranges checked in Perthshire had an occupancy rate of 64% (28 pairs). Twenty nests were monitored and 14 (70%) were successful, rearing a minimum of 40 young. In Angus, 30 home ranges were checked and 17 (57%) were occupied by pairs. Fourteen nests were monitored and 11 (79%) reared at least 33 young. Combined, the mean brood size per successful pair was 2.9

Table 14: Breeding Success of Merlins in Scotland, 2004.

Region & study area	Home ranges checked	Home ranges occupied by a pair	Monitored pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Estimated number of young fledged
Shetland	20	7	7	4+	4	9
Orkney	22	22	17	11	9	21
Highland						
- Skye and Rum	4	3	2	2	2	7
- Sutherland	57	45	15	8	8	22
- Caithness	4	4	3	1	1	2
- Ross-shire	3	3	3	3	3	7
- Inverness-shire	6	3	2	2	2	7
- Nairn	7	2	2	2	2	5
- West Moray	16	7	7	6	1	3
sub-total	97	67	34	24	19	53
Northeast Scotland						
- East Moray	25	12	11	8	6	16
- Lower Deeside	24	9	8	5	4	11
- Mid/Upper Deeside	32	18	18	13	13	40+
- Donside	22	9	8	5	5	13
sub-total	103	48	45	31	28	80+
Tayside						
- Perthshire	44	28	20	15	14	40+
- Angus	30	17	14	14	11	33+
sub-total	74	45	34	29	25	73+
Central Scotland						
Argyll	13	11	1	1	1	1+
South Strathclyde	16	15	10	9	7	15+
Lothian & Borders						
- Pentland Hills*	6	5	3	3*	3	10
- south of Peebles	6	3	1	1	1	3
- Moorfoot Hills	5	3	3	3	2	8
- Lammermuir Hills	27	18	12	11	8	33
sub-total	44	29	19	18	14	54
Dumfries & Galloway						
	13	9	8	8	8	13+
TOTAL	403	254	175	135+	115	319+

* includes one pair that relaid after an earlier failure

young and productivity overall was 2.1 young per laying pair. These figures are down on 2003, though not nearly so much as in the study areas further north.

Central

A single home range was occupied but no further checks were carried out.

Argyll

Thirteen home ranges were checked and 11 showed signs of occupation. Only one breeding attempt was monitored, which proved successful but no count of the brood size was possible.

South Strathclyde

Sixteen home ranges were checked. Pairs of Merlin occupied fifteen ranges and 10 breeding attempts received follow-up visits. Seven pairs bred successfully and a minimum 15 young fledged.

Lothian & Borders

There are four study areas in this region. The main two in the Lammermuir and Pentland Hills received similar coverage to previous years, whilst in the Moorfoot Hills and the Peebles area coverage declined with the retirement of a key observer. The Lammermuirs received checks at 27 known home ranges and 18 had signs of occupation. Nests were located at 12 home

ranges and eight were successful in rearing 33 young. All eight had clutches by early May. The four failures were all at nests where eggs were laid a week or two later. Heavy rain during the last week in June, when young will still have been present in the later nests, appears to be a likely cause for failure. In the tree nesting population in the Pentland Hills study, six home ranges received checks. Five were occupied, but competing Kestrel and Long-eared Owl pairs displaced two pairs. Three breeding attempts were monitored. One pair failed at the egg stage but re-laid and reared four young. The other two pairs were also successful and the three successful pairs reared 10 young. Elsewhere in the region, two successful pairs in the Moorfoots reared eight young and a single nest found south of Peebles reared three. Overall, in the region, breeding success was good with the mean brood size per successful pair at 3.9 young and productivity at 2.8 per laying pair.

Dumfries & Galloway

Occupancy checks were carried out at 13 home ranges and nine pairs were present. Eight nesting attempts were monitored and all eight were successful. The 13+ young counted is a bare minimum as there were four broods of 1+ young, three of 2+ young and a single accurate count of 3.

Eurasian Hobby

Falco subbuteo

Despite an estimated population in England and Wales of about 2200 pairs (Clements 2001), the Hobby remains a very scarce breeding species in Scotland. In recent years, 1-3 pairs have been located in Highland and young have been reared. However, in 2004 there were no confirmed nesting attempts, though a few sightings in Highland hint at possible breeding. Adults were seen in Badenoch in June and regularly during August hunting at a Sand Martin colony. Further north, close views were obtained of another adult in apparently suitable habitat near Bonar Bridge, Sutherland in early July.

Peregrine Falcon

Falco peregrinus

The Peregrine remains a firm favourite for long-term breeding studies amongst raptor groups. It is also one of the most widespread raptor species in Scotland and is no longer confined to remote moorland crags or precipitous sea-cliffs. Pairs are increasingly moving into man-made sites, such as lowland quarries (both active and disused), building ledges, bridges and storage towers. In 2004, 579 known home ranges were checked for occupation in Scotland (Table 15); adult pairs were present at 375 (64%) and single birds at a further 31 home ranges (5%). Follow-up visits were made to 326 of them and a minimum of 301 pairs laid eggs. Of these, 237 pairs (79%) reared a minimum of 522 young. Mean brood size was 1.6 young per monitored occupied home range.

Orkney

Peregrine pairs occupied all the 13 home ranges checked but only six were confirmed as laying eggs. Most, if not all, of the remaining seven probably laid eggs too, but failed at an early stage, as no young were present on later visits. There were five successful pairs producing nine young. Mean brood size per monitored occupied home range was a low 0.7 young.

Uist

Only two known home ranges were checked. Both were successful, raising five young.

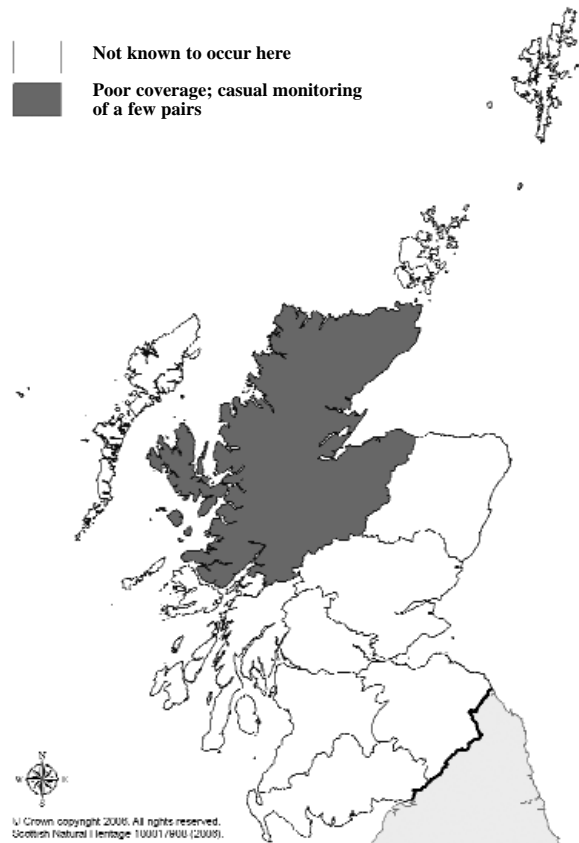


Table 15: Breeding success of Peregrine Falcons in Scotland, 2004.

Region	Home ranges checked	Home ranges occupied by pairs	Home ranges occupied by single birds	Occupied home ranges monitored*	Pairs confirmed as laying eggs	Pairs fledging young	Minimum number of young fledged
Orkney	13	13	0	13	6	5	9
Uist	2	2	0	2	2	2	5
Highland	36	28	1	25	25	19	44
Northeast Scotland	110	57	6	51	40	36	81
Tayside & Fife							
- east of A9 and M90	36	24	3	22	22	17	36
- west of A9 and M90	33	24	2	23	20	20	43
- Angus inland	41	24	2	17	17	14	29
- Angus coast	4	4	0	4	4	3	6
Central Scotland	35	29	1	25	22	18	36
Argyll	31	23	5	17	17	13	24
South Strathclyde							
- inland	36	18	0	18	17	11	25
- coast	11	8	1	8	8	7	14
Lothian & Borders							
- inland	72	42	4	31	31	24	58
- coast	13	12	1	7	7	4	10
Dumfries & Galloway							
- Nithsdale	26	12	1	10	10	6	17
- Galloway inland	32	20	1	15	15	12	26
- Moffat and Eskdale	20	15	0	13	13	9	24
- Wigtown & Kirkudbright coast	28	20	3	18	18	17	34
TOTAL	579	375	31	319	294	237	521

* excludes home ranges occupied by a single bird

Highland

Visits to 36 home ranges were carried out and pairs were present at 28 (78%). Breeding attempts were monitored at 25 of these and 19 (76%) were known to fledge 44 young. This may be an underestimate: at five nests, no accurate brood count was made. Productivity was 1.8 young per monitored occupied home range.

Northeast Scotland

A large sample of 110 known home ranges was checked and 63 (57%) were occupied, six by single birds. The occupancy rate varied between 43% on grouse moors and 71% at other inland sites. Fifty-one home ranges received follow-up visits and clutches of eggs were confirmed at 40 of them. Breeding success was good with 36 pairs fledging a minimum of 81 young. The mean brood size was 1.6 young per monitored occupied home range.

Tayside

East of the A9 and M90 roads (including parts of Fife)

Thirty-six home ranges were checked for occupancy and 24 pairs (67%) were present. Single birds were present at an additional three ranges. Twenty-two breeding attempts were monitored and 17 (77%) were successful. The 36 fledged young give a mean brood size of 1.6 per monitored occupied home range.

West of the A9 and M90 roads

In a study area west of these arterial trunk roads, 33 home range nest sites were visited. Pairs were present at 24 (73%) and single birds at an additional two. Three pairs were apparently non-breeding and 21 laid clutches of eggs. Twenty breeding attempts were monitored and all were successful, rearing at least 43 young. Mean brood size per monitored occupied home range (n=23) was 1.9 fledged young.

Angus inland

Most of the home ranges in this study area are on grouse moor. Forty-one were checked and 24 (59%) had pairs in occupation. There were two additional single birds. Seventeen laying pairs were monitored and 14 pairs (82%) bred successfully rearing a minimum 29 young. Mean brood size per occupied home range monitored was 1.7 fledged young.

Angus coast

There are four coastal home ranges in Angus and all four were occupied by breeding pairs in 2004. Three pairs bred successfully and a minimum six young fledged.

Central

There was a high occupancy rate in the Central Scotland study area with 29 of 35 (83%) home ranges occupied by pairs and an

additional single bird at another. Twenty-five breeding attempts were monitored and clutches of eggs were laid in at least 22. Nest success was also high with 18 nests (82%) raising 36 young. Mean brood size was 1.4 young per occupied home range monitored.

Argyll

Thirty-one home ranges received checks in the spring and Peregrine pairs occupied 23 (74%). Single birds were present at five ranges. Monitoring visits were carried out at 17 nests and eggs were laid in all. There were 13 successful breeding attempts (76%) and a minimum count of 24 young was made. The mean brood size per occupied home range was 1.4 young monitored.

South Strathclyde

Inland

Sheepwalk, forestry and grouse-moor in that order are the main land uses in this study area. Pairs occupied half the 36 home ranges visited and clutches of eggs were laid in all 18. Eleven (61%) were successful and 25 young were reared. This gives a mean brood size of 1.4 young per occupied home range monitored.

Coast

Eleven coastal home ranges were checked; pairs occupied eight (73%) and a single bird was seen at one. Clutches were laid at all eight and seven (87%) reared 14 young. Mean brood size was 1.7 young per occupied home range monitored.

Lothian & Borders

Inland

In this extensive study, over 40% of the 72 home ranges visited encompass active grouse-moors, the dominant upland habitat in the region. Pairs of Peregrines were present at 42 ranges (58%) with single birds present at another four. There were nests with eggs in at least 31 home ranges and 24 (77%) of these were successful. A minimum of 58 young fledged; a mean of 1.9 young per occupied home range monitored.

Coastal

Thirteen home ranges that were checked came into this category. All were occupied, though one involved a single bird. Seven breeding attempts were monitored and four (57%) reared ten young. Mean brood size was 1.4 per occupied home range monitored.

Dumfries & Galloway

Nithsdale

Nithsdale lies north of the town of Dumfries and the study area is mainly sheepwalk, grouse-moor and forestry. Checks were carried out at 26 home ranges; 12 pairs (46%) were in occupation and a single bird was present at another. Ten breeding attempts were monitored. Six pairs (60%) succeeded in rearing 17 young, giving a mean brood size of 1.7 young per occupied home range monitored.

Galloway inland

Forestry and sheepwalk dominate this study area. Thirty-two home ranges were checked for occupation in the spring and 20 pairs (62%) and a single bird were found. Fifteen breeding attempts were monitored and 12 (80%) successfully reared 26 young. Mean brood size was again 1.7 young per occupied home range monitored.

Moffat and Eskdale

Primarily sheepwalk and lying immediately east of the Nithsdale study area, 20 home ranges in Moffat and Eskdale were checked in 2004. Fifteen Peregrine pairs were in

occupation. Thirteen breeding attempts received follow-up checks and nine (69%) successfully reared 24 young. Mean brood per monitored occupied home range was 1.8 fledged young.

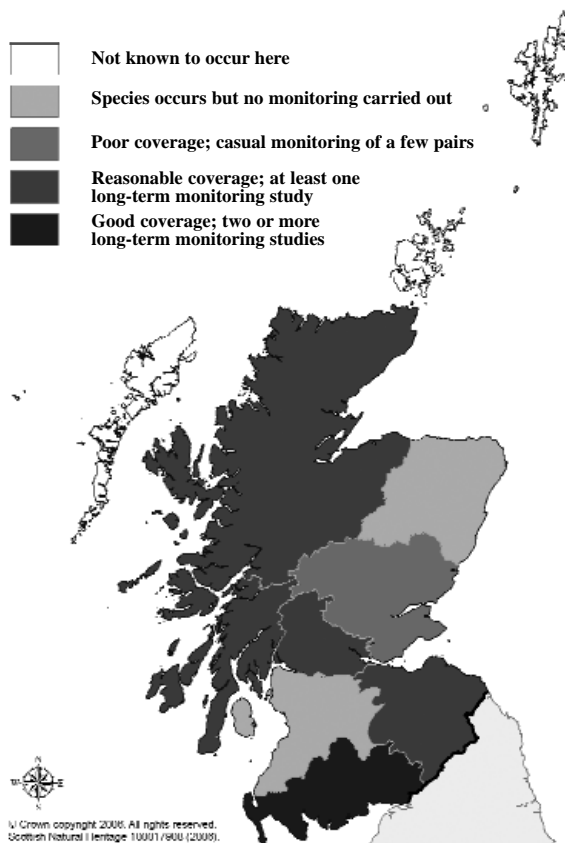
Wigtown & Kirkcudbright coast

Backed by coastal farmland, 28 home ranges in this study area received visits in the spring. Pairs were present at 20 (71%) and three ranges had single birds. Eighteen breeding attempts were monitored. There was only a single breeding failure. Seventeen pairs raised 34 young. This is a minimum count; at six nests the number of young recorded was 1+ and possibly at least 40 young fledged. Using the recorded count, the mean brood size was still a high 1.9 young per monitored occupied home range.

Barn Owl

Tyto alba

Overall, in Scotland, 279 known nesting locations were checked (Table 16). Two hundred and fifty-two were occupied and eggs were laid at 226 nest sites (90%), the same number as 2003. Breeding success was similar to 2003; 197 nests (87%) reared young, compared with 209 nests (92%) the previous year. However, brood size was lower; 535 young produced in 2004 and a mean brood size of 2.4 per nesting pair, compared with 656 young in 2003 and a mean brood size of 2.9. There were no second clutches or broods found in 2004 (there were five in 2003).



Level of coverage of: Barn Owl

Table 16: Breeding success of Barn Owls in Scotland, 2004.

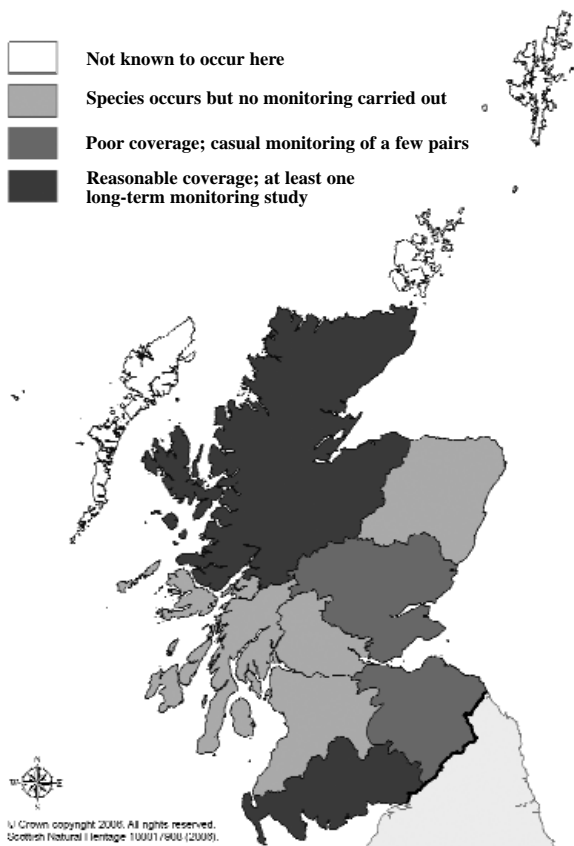
Region	Nesting locations checked	Nesting locations occupied	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Highland	34	26	24	21	59
Tayside	2	2	2	2	9
Central Scotland	33	33	31	28	61
Argyll	31	29	25	14	41
Lothian & Borders	11	11	6	6	16
Galloway					
- Galloway Forest	26	23	20	16	34
- West Wigtownshire	95	84	78	75	225
- Kirkcubrightshire & Dumfries	42	39	36	34	89
- other areas	5	5	4	1	1
Galloway subtotal	168	151	138	126	349
TOTAL	279	252	226	197	535

Table 17: Breeding success of Tawny Owls in Scotland, 2004.

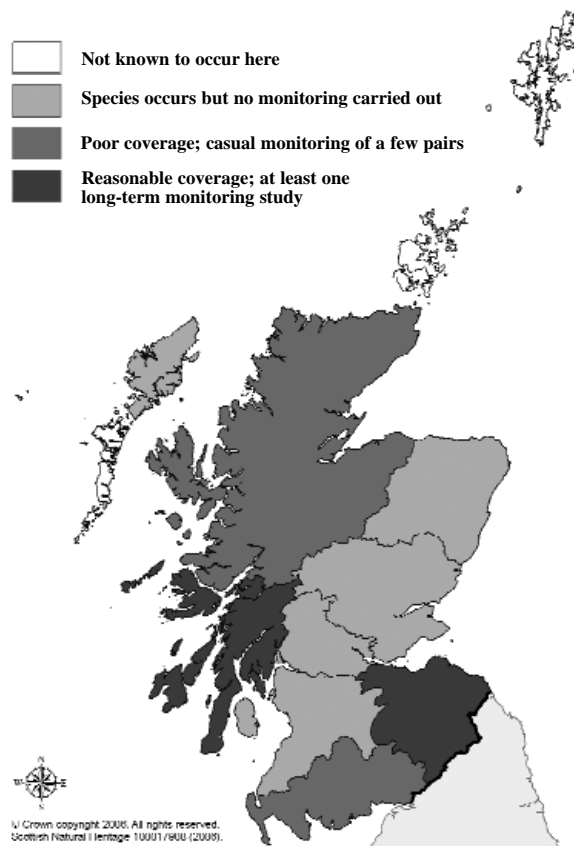
Region	Nesting boxes checked	Boxes occupied	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged	Nesting success	Young per laying pair
Highland	62	45	40	34	66	85%	1.6
Tayside	1	1	1	1	5		
Lothian & Borders	6	6	3	3	7		
Dumfries & Galloway	29	23	23	19	30	83%	1.3
TOTAL	98	75	67	57	108	85%	1.6

Table 18: Breeding success of Long-eared Owls in Scotland, 2004.

Region	Pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Highland	3	3	6
Argyll	1	1	3
Lothian & Borders	15	15	37
Dumfries & Galloway	1	1	3
TOTAL	20	20	49



Level of coverage of: Tawny Owl



Level of coverage of: Long eared Owl

Tawny Owl

Strix aluco

The majority of Tawny Owl breeding attempts monitored were of pairs nesting in boxes, usually as part of a number of dedicated studies based either in either Highland or Dumfries & Galloway (Table 17, overleaf). Monitoring effort was virtually the same between 2003 and 2004, but the number of young fledged declined in the two main study areas. The decrease was particularly marked in Dumfries and Galloway. Nesting success, however, remained unchanged between the two years. An exceptional brood of five young fledged from the single nest monitored in Tayside.

Long-eared Owl

Asio otus

Because of their secretive nature, breeding Long-eared Owls are a difficult species to monitor effectively. Reporting effort remains low, most nests were accidentally found during studies of other species. It is difficult to comment on any pattern emerging from such a small sample of nests (Table 18, overleaf). All 20 found were successful and averaged just under 2.5 young each, a situation very similar to 2003.

Short-eared Owl

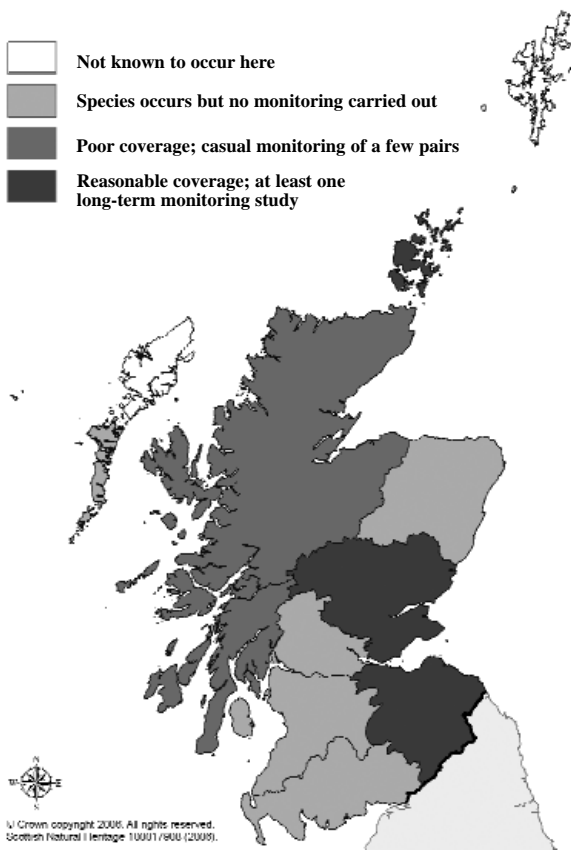
Asio flammeus

There was an increase in the number of occupied breeding sites located in 2004 and of breeding attempts monitored (Table 19).

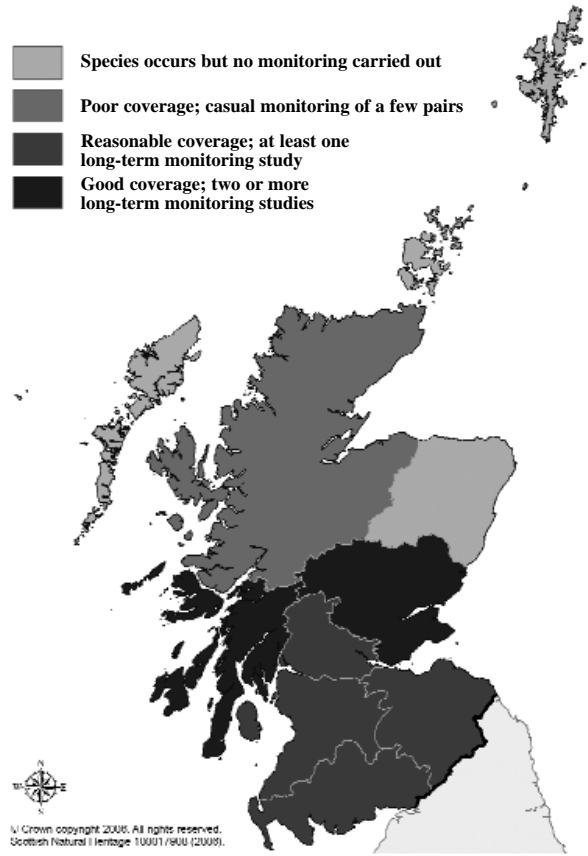
Fieldworkers taking part in the national Hen Harrier survey were asked to record all sightings of Short-eared Owls, resulting in increased effort. In addition, it is likely that increased numbers of this nomadic owl may have been present due to the widely reported peak in vole numbers.

On Orkney, there were at least 42 occupied territories and five nests were found. Unfortunately, none of these received follow up visits. In Highland, where no breeding attempts were recorded in 2003 and sightings of adults were scarce, five active nests were found and four were monitored. The number of nests found in Argyll, 16, was up 100%. Overall, 20 nests were monitored and 16 (75%) of them were successful. Clutch size was in the range 3-7 (n=8) and averaged 4.4 eggs. A complete count of the number of young fledging from nests of this species is often difficult to obtain due to the habit of young dispersing before they can fly. Brood size was in the range 1-6 and a minimum of 45 young was recorded giving a mean fledged brood size of 2.25 per laying pair.

Based on the sightings of Short-eared Owls by fieldworkers taking part in the 2004 Hen Harrier survey, Calladine *et al.* (2005) produced an estimate of 423-658 apparently occupied territories for Scotland. This equates to the lower range of the estimate for 1988-91 given in Annex 3, but it was acknowledged that the survey methodology in 2004 would most likely underestimate numbers. This is because fieldwork for the Hen Harrier survey probably did not always coincide with the times at which Short-eared Owls are thought to be most active (in the early morning and evening); and also the Hen Harrier survey focused on moorland habitats rather than the extensive



Level of coverage of: Short eared Owl



Level of coverage of: Raven

grassy areas which may be favoured by Short-eared Owls. However, the census squares selected for the Hen Harrier survey did effectively sample the known distribution of Short-eared Owls in Scotland (including 42% of the 10km squares reported as occupied by Short-eared Owls in Scotland during fieldwork for the 1988-91 Breeding Atlas), except for lowland areas along the east coast. Figure 4 (inside back cover shows the distribution of records of Short-eared Owls submitted to this survey.

Work to further develop survey methodologies for Short-eared Owls with a view to producing more robust estimates of population size is being undertaken by the British Trust for Ornithology Scotland and Scottish Natural Heritage, in partnership with the Scottish Raptor Study Groups and other member organisations of the Scottish Raptor Monitoring Group.

Common Raven
Corvus corax

A substantial increase in breeding records was received in 2004. Whether this was due to improved monitoring or a genuine population increase is not known, though the latter is strongly suspected in central and eastern locations. Overall, Ravens enjoyed a particularly successful breeding season with 154 of 164 monitored nests (94%) producing young (Table 20). Mean brood size at 2.5 young per nesting attempt is probably an under estimate as the number of young fledged in 15 broods was unknown and these were credited with only a single fledgling. An increasing number of pairs in the south and central areas are now nesting in trees. If this habit spreads into the north and

northeast, it will greatly extend the amount of habitat available for breeding pairs.

Highland

Nine known breeding sites were checked on the mainland and eight were occupied. All eight pairs bred successfully, including a pair at a lowland coastal site on the Black Isle. Five nesting pairs were monitored on both Eigg and Skye and 15 young fledged on each island.

Tayside

On the eastern grouse-moors of Angus, nine pairs were located. Four nests were monitored and all were successful, producing nine young. Further west in Perth & Kinross, 37 known home ranges were checked and 35 were occupied. Twenty-nine nesting attempts were monitored and there was only a single failure. At least 70 young fledged.

Central Scotland

Twenty-nine home ranges were checked in Central Scotland. Pairs were present at 28 sites. The breeding attempts of nine pairs were not monitored and a further two pairs were apparently non-breeders. The remaining 17 breeding pairs all produced young; a minimum of 38 were counted.

Argyll

On the mainland, 27 home ranges were checked and all were occupied by pairs of Ravens. Seventeen nesting pairs were monitored and 14 were successful in rearing 38 young. On the islands, 11 nesting pairs on Colonsay were monitored and nine produced 27+ young. On Bute, nine nesting pairs were checked

Table 19: Breeding success of Short-eared Owls in Scotland, 2004.

Region	Occupied sites	Nests found	Nests monitored	Successful nests	Minimum number of young fledged
Orkney	42	5	0	-	-
Highland	5	5	4	4	7
Tayside	18	8	8	7	25
Argyll	16	16	3	0	0
Lothian & Borders	21	5	5	5	13
TOTAL	102	39	20	16	45

Table 20: Breeding success of Common Ravens in Scotland, 2004.

Region	Home ranges checked	Home ranges occupied	Monitored pairs laying eggs	Pairs fledging young	Minimum number of young fledged
Highland					
- mainland	9	8	8	8	18
- Skye	5	5	5	5	15
- Eigg	5	5	5	5	15
Tayside					
- Angus	9	9	4	4	9
- Perth & Kinross	37	35	29	28	70
Central Scotland	29	28	17	17	38
Argyll					
- mainland	27	27	17	14	38
- Colonsay	13	12	11	9	27
- Bute	14	11	9	8	35
- Islay	2	2	2	2	10
South Strathclyde	30	28	23	22	59
Lothian & Borders	18	15	14	13	45
Dumfries & Galloway	23	23	20	19	38
TOTAL	221	208	164	154	417

and eight produced 35 young, whilst the two pairs reported on Islay produced 10 young in total.

South Strathclyde

Pairs occupied 28 of 30 home ranges checked. Follow up visits were carried out on 23 nesting attempts and there was only a single failure. At least 59 young were known to fledge.

Lothian & Borders

Eighteen home ranges received an initial check and 15 were occupied. Fourteen breeding attempts were monitored and 13 successfully reared 45 young.

Dumfries & Galloway

Twenty-three occupied home ranges were located and 20 received follow up checks. Again there was only a single breeding failure and 38 young successfully fledged.

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Annex 1: Raptor, owl and Common Raven nest site and home ranges data submitted under the Scottish Raptor Monitoring Scheme in 2004.

Species	Argyll RSG	Central Scotland RSG	Dumfries & Galloway RSG	Highland RSG	Lothian & Borders RSG	Northeast Scotland RSG	Orkney RSG	South Strathclyde RSG	Tayside RSG	Uist RSG	Shetland	RSPB Scotland	TOTAL
European Honey-buzzard				1									1
Red Kite		[24]	[8]	[65]					[7]			104	104
White-tailed Eagle												32	32
Eurasian Marsh Harrier				1		2	1		4				8
Hen Harrier	97	13	21	67	10	15	75	87	32	40			457
Northern Goshawk			21	11	57	34		3	6				132
Eurasian Sparrowhawk	15	1		4	1		5	41	3	2			72
Common Buzzard	127	37	12	136	47		3		16	8			386
Golden Eagle	65	7	5	82	2	23			24	24			232
Osprey	9	16	1	120	7	18			59				230
Common Kestrel	14	2	3	23	35		13	33	9				132
Merlin	13	1	13	97	44	103	22	16	74		20		403
Eurasian Hobby													0
Peregrine Falcon	31	35	106	36	85	110	13	47	114	2			579
Barn Owl	31	33	168	34	11				2				279
Tawny Owl			29	62	6				1				98
Long-eared Owl	1		1	3	15								20
Short-eared Owl	16			5	21		42		18				102
Common Raven	56	29	23	19	18			30	46				221
TOTAL	475	174	403	701	359	305	174	257	408	76	20	136	3488

Annex 1 shows the total number of all breeding sites and home ranges (by area) checked in 2004 and reported under the SRMS. This includes traditional nesting sites and home ranges that were found unoccupied during the visit, and also sites and home ranges which were found occupied but received no follow-up visits, so their breeding success is unknown. Some area breakdowns are not given to protect localities.

Annex 2: Raptor, owl and Common Raven breeding attempts monitored under the Scottish Raptor Monitoring Scheme in 2004.

Species	Argyll RSG	Central Scotland RSG	Dumfries & Galloway RSG	Highland RSG	Lothian & Borders RSG	Northeast Scotland RSG	Orkney RSG	South Strathclyde RSG	Tayside RSG	Uist RSG	Shetland	RSPB Scotland	TOTAL
European Honey-buzzard				1									1
Red Kite		[16]	[3]	[35]					[6]			60	60
White-tailed Eagle												28	28
Eurasian Marsh Harrier							1		4				5
Hen Harrier	63	10	17	49	4	14	74	81	25	22			359
Northern Goshawk			11	6	26	22			2				67
Eurasian Sparrowhawk	12	1		3	1		5	19	3				44
Common Buzzard	70	31	7	104	41		3		15	8			279
Golden Eagle	51	7	3	49	2	16			9	14			151
Osprey	8	14	1	81	3	18			57				182
Common Kestrel	10	2	3	20	32		13	26	4				110
Merlin	1		8	34	19	45	17	10	34		7		175
Eurasian Hobby													0
Peregrine Falcon	17	25	56	25	38	51	13	26	66	2			319
Barn Owl	25	31	138	24	6				2				226
Tawny Owl			23	40	3				1				67
Long-eared Owl	1		1	3	15								20
Short-eared Owl	3			4	5				8				20
Common Raven	39	17	20	18	14			23	33				164
TOTAL	300	138	288	461	209	166	126	185	263	46	7	88	2277

Annex 2 shows the total number of all breeding sites and home ranges (by area) that were found to be occupied and which received follow-up visits in 2004, i.e. they were effectively monitored to enable a level of breeding success and productivity to be estimated. Some area breakdowns are not given to protect localities.

Annex 3: Estimated population size and monitoring effort of Scottish raptors, owls and Common Raven in 2004.

Species	Most recent estimate of Scottish Population	Measure (as defined in the estimates)	Year of estimate	Reference(s)	No. of occupied territories/ ranges reported to SRMS in 2004	No. of breeding pairs reported to SMRS in 2004 (pairs laying)	Notes
European Honey-buzzard	4 (14)	Confirmed (confirmed + probable breeding pairs)	2000	Ogilvie, 2003	2	1	
Red Kite	60	Breeding pairs	2004	This report	71	60	
White-tailed Eagle	28 (32)	Laying (laying + territorial pairs)	2004	This report	32	28	
Eurasian Marsh Harrier	5 (8)	Breeding pairs (breeding pairs +pairs located)	2004	This report	8	5	
Hen Harrier *	633	Territorial pairs	2004	Sim <i>et al.</i> in press	417	326	The population estimate for Scotland from the 2004 national survey is an extrapolation from surveys in a sample of 10km squares throughout the known range of the Hen Harrier (Sim <i>et al.</i> in press). Criteria for identifying territorial pairs under the national survey include behavioural observations which indicate a breeding attempt is ongoing (e.g. a food pass/courtship/ display/agitated behaviour) as well as the location of a nest with eggs; therefore laying pairs as reported under the SRMS are not directly comparable with territorial pairs.
Northern Goshawk	86	Occupied home ranges	2004	This report	86	67	The total Scottish population is likely to be in excess of 86 pairs (Park <i>et al.</i> 2005).
Eurasian Sparrowhawk *	7,000	Pairs with nests	1988-91	Greenwood <i>et al.</i> 2003, Park <i>et al.</i> 2005	58	44	Not all the occupied territories reported to SRMS were checked throughout the season (Table 7) so the number of breeding (laying) pairs is a minimum estimate.
Common Buzzard	7,100-25,600	Territorial pairs	2003	Park <i>et al.</i> 2005	-	279	The range in the estimate of the Scottish population takes into account various observed rates of change in distribution and abundance including data from the Breeding Bird Survey (see Park <i>et al.</i> 2005). The actual Scottish population is believed to be towards the higher end of this range.

Annex 3 (continued)

Species	Most recent estimate of Scottish Population	Measure (as defined in the estimates)	Year of estimate	Reference(s)	No. of occupied territories/ ranges reported to SRMS in 2004	No. of breeding pairs reported to SMRS in 2004 (pairs laying)	Notes
Golden Eagle *	441	Breeding pairs	2003	Eaton <i>et al.</i> in press	194	109	
Osprey	155 (182)	Pairs laying (pairs laying + pairs)	2004	This report	182	155	
Common Kestrel *	6,900	Pairs laying eggs	2003	Park <i>et al.</i> 2005	127	106	
Merlin *	800	Breeding pairs	1993-94	Greenwood <i>et al.</i> 2003, Rebecca & Bainbridge, 1998	254	175	
Eurasian Hobby	3	Territorial pairs	2003	Etheridge 2005	1	0	
Peregrine Falcon *	544	Breeding pairs	2002	Banks <i>et al.</i> 2003	406	294	
Barn Owl	300	"Pairs"	1995-97	Park <i>et al.</i> 2005, Greenwood <i>et al.</i> 2003, Toms <i>et al.</i> 2001	252	226	The current Scottish population is likely to be larger than that estimated by the 95-97 survey (Toms <i>et al.</i> 2001)
Little Owl	0 - 10	Occupied nest sites	1995-97	Greenwood <i>et al.</i> 2003	0	0	
Tawny Owl	3,900-5,700	Territorial/ breeding pairs	1988-91	Park <i>et al.</i> 2005, Greenwood <i>et al.</i> 2003	75	67	The total for occupancy in 2004 refers to nest boxes (Table 17).
Long-eared Owl	450 - 1,750	"Pairs"	1988-91	Park <i>et al.</i> 2005	-	20	
Short-eared Owl *	640 - 2,700	"Pairs"	1988-91	Park <i>et al.</i> 2005	102	39	
Common Raven *	1,400 - 13,200	"Pairs"	2003	Park <i>et al.</i> 2005	208	164	The 2003 estimate is based on extrapolations from the 1988-91 Atlas (Gibbons <i>et al.</i> 1993; upper estimate) and Ratcliffe 1997, lower estimate), taking into account an 85% increase in abundance in Scottish Breeding Bird Survey squares between 1994 and 2003. Ratcliffe (1997) also suggested that estimates from national breeding atlas surveys might include an unknown proportion of birds of pre-breeding age. Experts consider that the real figure is rather lower than the upper estimate.

For species marked with *, the number of breeding pairs is a minimum figure, because not all the occupied territories reported to SRMS were checked throughout the season.

Annex 4: Raptor, owl and Common Raven nest site and home ranges data submitted under the Scottish Raptor Monitoring Scheme in 2003 (updated from 2003 report).

Species	Argyll RSG	Central Scotland RSG	Dumfries & Galloway RSG	Highland RSG	Lothian & Borders RSG	Northeast Scotland RSG	Orkney RSG	South Strathclyde RSG	Tayside RSG	Uist RSG	Shetland	RSPB Scotland National Survey	2003 National Survey	TOTAL
European Honey-buzzard				4										4
Red Kite												79		79
White-tailed Eagle												32		32
Eurasian Marsh Harrier				1			2		5					8
Hen Harrier	67	14	18	53	2	21	51	85	36	32				379
Northern Goshawk			19	4	56	32			6					117
Eurasian Sparrowhawk				7	3		3	27		2				42
Common Buzzard	120	36		131	51		4							342
Golden Eagle													652	652
Osprey	7	15	1	133	5	18			53					232
Common Kestrel	4			12	22		4	30	2					74
Merlin	9		20	83	57	103	16	11	69	9	10			387
Eurasian Hobby				1										1
Peregrine Falcon	28	30	109	35	87	109	15	48	118	16				595
Barn Owl	7	29	187	20	15				2					260
Tawny Owl			24	42					4					70
Long-eared Owl	2			7	7									16
Short-eared Owl	8				11				7					26
Common Raven	43	24	20	23			6	14	37					167
TOTAL	295	148	398	556	316	283	101	215	339	59	10	111	652	3483

Annex 4 provides the same information as Annex 1 but for 2003: this table is an updated version of Annex 1 in the 2003 report (Etheridge 2005).