SCOTTISH RAPTOR MONITORING SCHEME

REPORT 2011

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February 2013

Foreword

A record number of raptor territories were checked across the country for the 2011 breeding season, clear evidence of the increasing commitment of raptor fieldworkers in Scotland. It is pleasing to see people are taking heed of requests to increase the coverage of some of our commoner and more widespread species. We need to keep this going as we really don't know what is happening to species such as Common Kestrels.

This year also saw Forestry Commission Scotland becoming involved with the Scottish Raptor Monitoring Group (SRMG). We hope that in due course this will lead to better coverage of many of our forest nesting raptors. There's real scope here for building on the conservation and monitoring work they carry out with raptors on the national forest estate.

A conservation framework for the Hen Harrier in Scotland was published in 2011 (Fielding *et al.* 2011). The report was based on work commissioned by SNH in partnership with other members of the SRMG. It identified persecution as a key constraint on the distribution of this species in Scotland and the United Kingdom, adding to the body of evidence for population level impacts of illegal killing on some raptor species. Other constraints included habitat change from high levels of sheep grazing causing prey shortages for the Orkney population, and possibly the availability of suitable nesting habitat in some areas.

Now that we have a number of year's data, the SRMG is starting to produce raptor population trends, both nationally and regionally. BTO Scotland has been leading on this with SNH funding. This work along with annual reporting data will be extremely useful across a range of raptor related issues in Scotland. The Scheme data are frequently used by SNH in providing advice to Ministers and the Scottish Government. It is very important to the UK Government in reporting on the status of our raptors to the EU, and also for the current review of Special Protection Areas.

With the use of the Scheme data comes scrutiny, and it is important for the data to be as objective and robust as possible. That is why we really need everyone to supply the data as clearly as possible and also why the additional information asked for on the spreadsheet is needed. We in the Group do appreciate that not everyone likes spreadsheets or questionnaires (including some of us!) but the information we are gathering helps set the annual data in context and adds to the information that can be analysed - it is really useful to have this additional information.

I would like to thank the following for all their work on behalf of the Scheme: David Stroud (Joint Nature Conservation Committee), Patrick Stirling-Aird, Wendy Mattingley and Alan Heavisides (Scottish Raptor Study Groups), Chris Wernham, Andy Dobson and Anne Cotton (British Trust for Ornithology, Scotland), Gordon Patterson and Kenny Kortland (Forestry Commission Scotland), Mark Holling (Rare Breeding Birds Panel), Staffan Roos, Duncan Orr-Ewing and Jeremy Wilson (Royal Society for the Protection of Birds, Scotland), Gordon Riddle (Scottish Ornithologists' Club), Nigel Buxton, Simon Foster and Des Thompson (SNH), Brian Etheridge and Helen Riley for supporting the secretariat. In particular, I would like to thank the Raptor Monitoring Officer, Brian Etheridge, for leading the compilation of this report, and for his tireless work for the Scheme.

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Chair of the Scottish Raptor Monitoring Group

SCOTTISH RAPTOR MONITORING SCHEME – REPORT 2011

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1 Introduction

This is the ninth report of the Scottish Raptor Monitoring Scheme covering the year 2011. It follows the previous annual reports in the series (Etheridge 2005; Etheridge *et al.* 2006, 2007, 2008, 2010, 2011, 2012 a & b). The aim of the report is to provide clear and factual information on the breeding success of birds of prey in Scotland.

During 2011, work on a first set of trends in breeding numbers and breeding performance from SRMS datasets was completed, and the report will shortly be published by SNH (Roos *et al.* in press). For some species, like Red Kite and White-tailed Eagle, for which we know monitoring coverage has been almost 100% since the reintroductions look place, comprehensive trends have been produced for each sub-population, appropriate Natural Heritage Zones of Scotland (NHZs) and for the Scottish population as a whole. For other species for which monitoring coverage is not comprehensive, a first set of provisional trends will be available, for Scottish NHZs or specific study areas. For these species, further work is taking place to check in detail the extent of monitoring coverage and effort and whether this has changed through time, via a questionnaire survey of raptor workers in Scotland. This information will then be used to refine the trends for NHZs and/or the whole of Scotland if feasible, and will potentially contribute to raptor indicator(s) for Scotland. In future, we hope to be able to make all this information available via a SRMS website.

1.1 Scottish Raptor Monitoring Scheme (SRMS)

The SRMS was established on 24 June 2002 with the signing of an Agreement by the following parties: Scottish Natural Heritage (SNH), Joint Nature Conservation Committee (JNCC), Scottish Raptor Study Groups (SRSGs), British Trust for Ornithology, Scotland (BTO), Rare Breeding Birds Panel (RBBP), Royal Society for the Protection of Birds, Scotland (RSPB), and Scottish Ornithologists' Club (SOC) (Anon. 2002). In 2011, Forestry Commission Scotland was invited to join the scheme. The SRMS currently focuses primarily on the annual monitoring of the abundance, distribution and breeding success of diurnal birds of prey (Accipitriformes and Falconiformes) and owls (Strigiformes) native to Scotland. Because of its ecological similarity to raptors, the Common Raven is given honorary status as a bird of prey and is included in the Scheme.

1.2 Scottish Raptor Study Groups (SRSGs)

The SRSGs form a consortium of eleven regional raptor study groups (Figure 1) active during 2011 with a combined membership of more than 265, mostly voluntary, ornithologists. Members have extensive expertise in the field study of breeding birds of prey and conduct these studies largely in their own time. They have provided the bulk of the data collected in this report on raptor numbers, distribution and productivity. The majority of data submitted to the SRMS come in electronically in the customised MS Excel recording spreadsheet. This means that much of the routine data checking and processing can be done automatically, and the standard tables for the annual report can be generated quickly and efficiently. We are now looking ahead to further improve data submission and handling. We hope that the next couple of years will see the development of on-line data submission to further enhance the SRMS.

Figure 1. Scottish Raptor Study Groups in 2011.

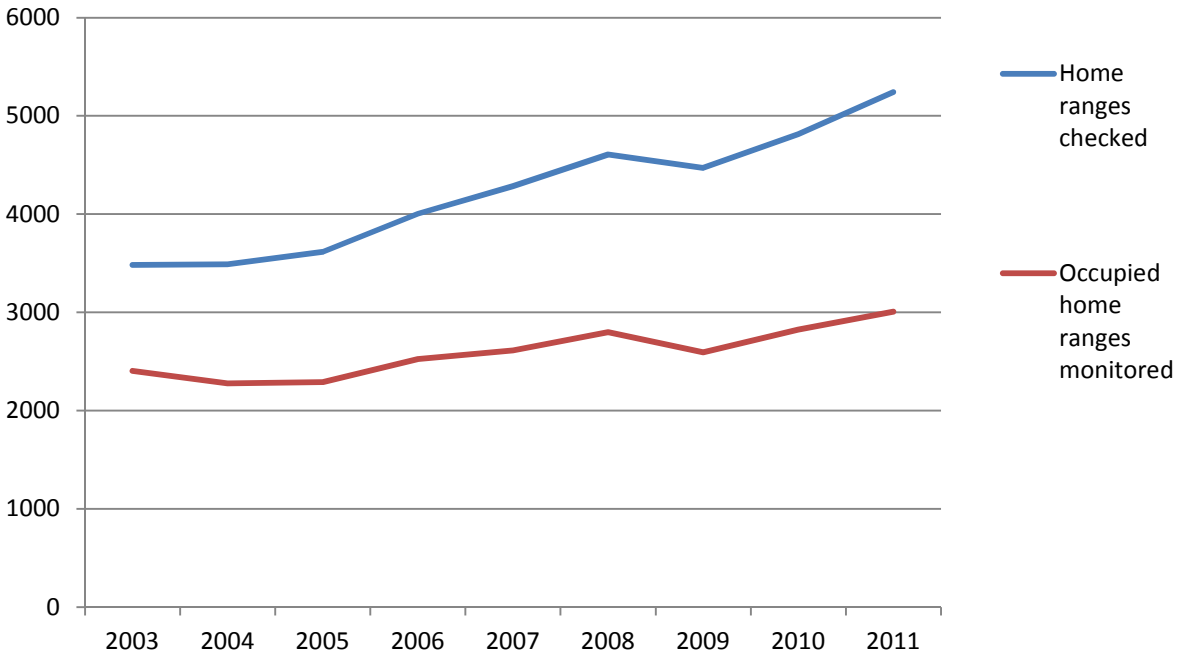

Figure 2. Raptor, owl and Common Raven home ranges checked for occupation and later monitored; the data subsequently submitted to the Scottish Raptor Monitoring Scheme, 2003-2011.

1.3 Scottish Raptor Monitoring Group (SRMG)

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

2 Breeding report 2011

2.1 Introduction

Members of the eleven regionally based raptor study groups in Scotland (Figure 1), all of which are part of the Scottish Raptor Study Groups, were the main contributors to this breeding report. Important data were also supplied by species officers employed by RSPB Scotland, primarily to monitor the reintroduced populations of Red Kite and White-tailed Eagle. Other organisations supplying data were Haworth Conservation Ltd, Natural Research Ltd and RPS Group. Rare Breeding Birds Panel data were also extracted from the annual returns to SNH and BTO by the small number of Schedule 1 licence holders who are not members of the SRSGs. Annex 1 provides a regional breakdown, based on Scottish Raptor Study Group boundaries (Figure 1), of the raptor home ranges that received at least one visit in the spring of 2011 to check on occupancy. A total of 5246 home ranges were visited, a 9% increase on the 2010 total of 4811 (Table 1), and continuing an upward trend since 2003 (Figure 2). The number of home ranges visited in 2011 was almost 50% higher than it was nine years ago. Not all these home ranges held pairs: some had only single birds and others were apparently vacant. If the monitoring effort is carried out rigorously each year, the occupancy rate expressed as a percentage of home ranges visited may reflect changes in population levels. Equally important are follow up visits to confirm the findings of the first visit and to monitor the nesting success of pairs present. This nesting success, normally expressed as the percentage of monitored pairs producing fledged young, together with the mean brood size, can also provide a window on the health of the population. Table 1 also shows that 3011 potential breeding pairs received further visits in 2011, enabling their nesting success to be determined. This constitutes a 6.5% increase on the previous year total of 2824 and is the highest total since the start of the scheme in 2003 (Table 1). The number of occupied home ranges monitored increased 25% in the last nine years from 2003. A regional summary of these monitored home ranges is provided in Annex 2.

Weather wise, 2011 was a year of mixed blessings for both birds of prey and owls. Following the severe winter of 2009/10, the winter of 2010/11 was almost as harsh. There were extended periods of daytime frost and prolonged periods of deep snow cover through to the end of March in the north. This appears to have had a negative effect on the abundance of some common resident passerines such as Skylark *Alauda arvensis*, Wren *Troglodytes troglodytes*, Mistle Thrush *Turdus viscivorus*, Grey and Pied Wagtails *Motacilla cinerea* and *M. alba*, and Reed Bunting *Emberiza schoeniclus,* all of which declined between 2010 and 2011 (Risely *et.al.* 2012). A reduction in prey numbers may have impacted further on those raptors that hunt them. Conversely, Field Vole *Microtus agrestis* numbers did very well over winter, protected by a mantle of snow, they became

available in large numbers to predators but only after the thaw in early spring. Finally, on the 24th May, gale force winds gusting to 50-100mph struck four regions of Scotland. Many trees were uprooted and the exposed nests of both Ospreys and Red Kites destroyed. This was a particularly vulnerable period of the breeding season with both species having small young or eggs on the point of hatching. For those pairs that lost their nests, the breeding attempt was over for the year as it was too late for them to lay a replacement clutch.

2.2 Observer coverage

For some of the scarcer species, such as Red Kite, Marsh Harrier, White-tailed Eagle and perhaps Osprey, a high proportion of the breeding population, reaching 90-100% for some species, is monitored each year, mainly by RSPB personnel and specialist groups. Amongst volunteer fieldworkers, the appeal of carrying out fieldwork on open moorland and mountain habitats is strong. Thus four widely but thinly spread upland species, Hen Harrier, Golden Eagle, Merlin and Peregrine Falcon, with Scottish breeding populations in the range of 400–800 pairs, receive excellent coverage, with up to 50% of the breeding population monitored annually. Also receiving good coverage are two lowland owl species, Barn and Tawny Owl, both because they readily adapt to nest boxes, thus allowing easier study. Common Buzzard and Common Raven attract support from a growing number of raptor enthusiasts, and although there are several substantial regional gaps in coverage for the former, offering monitoring opportunities for new fieldworkers, record numbers of breeding records for both species were received in the year. A few species in Scotland - either because of their extreme scarcity (European Honey-buzzard and Eurasian Hobby), sporadic occurrence, and/or secretive behaviour (Short-eared and Long-eared Owl) - present challenges as far as monitoring is concerned. Two widespread species attract little attention from the majority of field workers. Coverage of breeding Eurasian Sparrowhawks and Common Kestrels needs to increase if we are to achieve effective monitoring to determine estimates of population size, annual productivity and long-term trends. This requirement is becoming ever more urgent as the declining status of these two species, in particular the Common Kestrel (Risely *et al.* 2012), is now causing concern.

2.3 Occupation of home ranges

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

Eurasian Sparrowhawk and Merlin, providing the habitat remains unchanged, such home ranges may be occupied by a succession of breeding pairs.

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

Cyclic changes in the annual and seasonal abundance of the Field Vole can have a profound effect on the breeding success on a number of raptor and owl species (e.g. see Petty *et al.* 2000; Lambin *et al.* 2000), particularly Common Kestrel, Barn Owl and Short-eared Owl (Village 1990; Taylor 1994; Korpimaki & Norrdahl 1991). If vole populations reach a peak during the spring and summer months, these predators can respond with an increase in the number of pairs settling to breed and a corresponding increase in brood size, nesting success and productivity; conversely, when vole numbers are low, the reverse can occur.

2.4 Terminology

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

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

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

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

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

Occupancy - a nesting range is occupied if a single bird or pair of birds is recorded during the breeding season, usually on more than one occasion, or if there is strong evidence that birds are present (moulted feathers, pellets, plucks, faecal splash).

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

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

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

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

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

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

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

2.5 Estimating breeding success: a note of warning

Ideally, all breeding attempts should be monitored from the start of pair formation to either breeding failure or the successful fledging of young. In a national scheme of this size, using data from a wide range of field workers, this ideal is not always achievable. The timing of survey visits may bias estimates of raptor breeding success. Individual fieldworkers often cover large geographical areas so first visits to different parts of the study area must necessarily be staggered, and usually areas that held breeding pairs of a target species in the previous year are prioritised. First visits to an area that occur later in the season may miss breeding attempts that failed early and overestimate nesting success. Non-breeding territorial pairs are a common component in raptor populations and these can be easily overlooked, exacerbating the problem. Therefore, there is a bias in favour of detection of nesting attempts that have a longer period of survival. In particular, nests are most likely to be found and examined at the chick stage; this places a strong positive slant on estimations of breeding success, as failure is more likely to occur at the pre-lay stage or during incubation. In the early years of the SRMS, it was not always possible to determine from data submitted at what stage in the breeding cycle individual nests received their first visit, nor in many cases of nest failure, what caused this to happen. The nest recording spreadsheet introduced at the start of 2005 (updated in 2009) and now widely adopted by raptor workers is helping to address these issues, and raptor observers are encouraged to submit information on the dates that they carry out every monitoring visit.

2.6 Persecution

Many factors influence the numbers, distribution and productivity of birds of prey in Scotland. A large proportion of the uplands, particularly in the south and east of Scotland, is given over to driven grouse shooting, managed by a full-time gamekeeper often with the assistance of one or more under-keepers. The keepers' primary aim is to manage the heather through regular burning and cutting to maximise the number of Red Grouse available for shooting and to control common and widespread predators such as crows, stoats, weasels and foxes. Historically gamekeepers also controlled birds of prey, but this practise became illegal in 1954. However, even after nearly 60 years of legal protection, birds of prey are still killed illegally in Scotland (Anon.

2012). Recent research has shown that these illegal activities, including nest destruction and the killing of sub-adults and adults, are adversely affecting the conservation and status of several species. On many driven grouse-moors certain raptor species are scarce or absent and many attempts to breed fail due to human interference (Etheridge *et al.* 1997; Hardey *et al.* 2003; Whitfield *et al.* 2004a & b, 2008; Redpath *et al.* 2010; Fielding *et al.* 2011; Amar *et al.* 2012). This can have a severe effect on species at a local or regional level by reducing the number of breeding pairs present and their breeding success. It will also impact on surrounding populations, if birds are drawn into areas of apparently suitable habitat which are unoccupied because previous inhabitants have been removed – the so-called "black hole" or "ecological trap" effect (Whitfield *et al.* 2004 a & b). Population modelling has indicated that persecution, mainly in the form of poisoning, is responsible for an estimated 3–5% of annual deaths of adult Golden Eagles, and in the absence of this mortality the Scottish population would increase (Whitfield *et al.*, 2004b, 2008). Illegal poisoning is a cause of poor population growth of re-introduced Red Kites in north Scotland, compared with similar populations in England (Smart *et al.* 2010). A negative correlation has been found between recorded incidents of Hen Harrier persecution in different areas of Scotland and the proportion of successful nests, and there is strong evidence that illegal persecution is causing the majority of breeding attempts to fail on grouse moors (Fielding *et al.* 2011) and is driving the current population decline on mainland Scotland (Hayhow *et al.* in press). Furthermore, in northern England, the productivity of Peregrine Falcons breeding on grouse moors was found to be 50% lower than non-grouse moor habitat, despite similar clutch and brood size between habitat types suggesting little difference in prey availability. Population modelling indicated that the grouse moor population of this raptor species was unsustainable and reliant on immigration (Amar *et al.* 2012).

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

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

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

Ongoing SRMS work to more thoroughly assess annual changes in monitoring coverage, to identify the causes of breeding failure and in particular cases of suspected persecution, and to collect related habitat data to characterise nesting attempts, will help to address whether these issues do indeed lead to any biases in the data collected.

The Scheme also aims to provide intelligence and evidence for illegal persecution wherever possible, in the form of objective information that can be passed to the National Wildlife Crime Unit. This will enable scheme data to add to and complement other sources of information on the persecution of birds of prey, such as annual reviews published by the RSPB (e.g. Anon. 2012).

3 Species accounts

3.1 European Honey-buzzard *Pernis apivorus*

Historically, there are sporadic records of breeding Honey-buzzards in Scotland dating back to the early 19th century, but it was not until the 1970s that birds were detected on an annual basis and successful breeding confirmed (Harvey 2005). Despite a greater awareness of their potential presence during the breeding season, they remain a very scarce summer visitor; illusive, secretive and under recorded. A realistic estimate of the breeding population will be difficult to achieve without a dedicated national survey by experienced fieldworkers familiar with Honey-buzzard identification, behaviour and habitat. In Scotland they are known to occur regularly in four regions; Highland, Moray, Tayside and Dumfries & Galloway. In 2011, a single pair fledged one young in Highland, whilst in Dumfries & Galloway three pairs bred and a minimum of four young successfully fledged.

3.2 Red Kite *Milvus milvus* (Tables 2 & 3)

Since 1989, the Red Kite has been successfully reintroduced to a four regions in Scotland. In 2011 the population reached a new high of 191 pairs. The most recent reintroduction, on the outskirts of Aberdeen in Northeast Scotland, showed the largest percentage annual increase (67%), from nine pairs laying eggs in 2010 to 15 pairs in 2011. Elsewhere growth averaged a lower 11%, giving an overall annual increase between 2010 and 2011 for Scotland of 14%. Since 1995, the number of pairs found breeding in Scotland has doubled every 4–6 years (Table 2). Despite these encouraging figures, Red Kites continue to suffer illegal persecution, it is believed almost exclusively through the use of poisoned baits on grouse moors and on other sporting estates. Highland Red Kites have the lowest growth rate of any reintroduced population in Britain (6% between 2010 and 2011). During the period 1999–2006, an estimated 166 kites from this population were illegally poisoned (Smart *et al.* 2010). This species receives almost complete coverage during the nesting season and 279 home ranges were either checked for occupation or newly located during the spring of 2011 (Table 3). Of these home ranges, 191 held pairs (68%) and 189 pairs were subsequently monitored. Egg laying was confirmed for 185 pairs (98%); 166 pairs succeeded in hatching eggs (88% of monitored pairs) and 155 (82%) fledged at least one young. This breeding success is a 2% improvement on the 2010 figures. Three hundred and thirteen young kites fledged, giving a mean brood size of 1.7 per monitored pair.

3.3 White-tailed Eagle *Haliaeetus albicilla* (Tables 4 & 5)

The White-tailed Eagle breeding population of the west Highlands and islands reached a milestone of 50 occupied territories in 2010 and increased again in 2011 by 10% (Table 4). A minimum of 49 pairs were confirmed to lay

eggs, and there were 33 (67%) successful breeding pairs (Table 5). This nesting success is average for the population which has varied within the 60–70% range for the past 6 years. However, productivity was down on the previous two years though still within the more recent range of 0.86–0.98 young per laying pair. Of the 33 broods, 24 were of one chick, eight were of two and there was one remarkable brood of three on one of the Small Isles.

3.4 Western Marsh Harrier *Circus aeruginosus* (Table 6)

The Marsh Harrier in Scotland remains a scarce breeder and passage migrant. There were signs of population expansion during the four years 2003–2006, when breeding pairs were recorded as far north as Orkney and Highland and a total of 69 young fledged (Table 6). Subsequently, breeding success and range have declined and the Scottish population has fallen to a lower level, confined to the extensive Tay reed beds. Five pairs were present in 2011 of which four fledged a total of 10 young.

3.5 Hen Harrier *Circus cyaneus* (Tables 7 & 8)

The 2010 National Hen Harrier survey estimated there were 505 pairs in Scotland, 76% of the UK and Isle of Man total. However, the Scottish estimate represented a significant 20% decline on the 633 pairs found in 2004 (Hayhow *et al.* in press). During 2011, monitoring of this declining species was maintained at a high level. Overall, 490 known home ranges were checked and 267 (54%) were occupied by pairs. This is the lowest occupancy rate recorded since the start of the scheme in 2003 (Table 7). Furthermore, the number of pairs laying eggs and fledging young was low, second only to 2008 when it was slightly poorer. On Orkney, coverage was again complete with 120 breeding females and pairs occupying home ranges at various stages during the breeding season. This high figure is likely to be an over estimate of the population as there may have been some double counting with pairs apparently failing at an early stage but moving on to another location for a later attempt. This is partly supported by the high failure rate recorded. Past declines of hen harriers on Orkney has been associated with high densities of sheep reducing the extent of rough grassland habitats and the abundance of Orkney voles (a key prey species), and a run of wet springs (Amar *et al.* 2011). There is a high incidence of polygyny in the population and secondary females in particular may suffer poor breeding success when food is limiting (Amar *et al.* 2005). Of the 114 occupied home ranges monitored on Orkney, 44 pairs (39%) failed early or at the pre-laying stage (Table 8). A further 33 failures (29%) occurred during the nesting cycle resulting in just 38 pairs (33%) successfully rearing 90 young. In other regions, breeding success was much higher and in the range 53–67%. Only in the Southwest and Southern Uplands with a success rate of 31% was it as poor. However, in this region, most failures occurred during the nesting cycle (54%) rather than pre-laying (15%) as occurred on Orkney. On the well watched uplands of eastern Scotland — Aberdeen, Angus and Lothian & Borders — much of which is managed as driven grouse moors, a combined total of just four pairs of Hen Harriers were located. This is a very low number, though not surprising given the high level of illegal persecution of birds of prey that is currently connected with this form of intensive game management (Fielding *et al.* 2011).

3.6 Northern Goshawk *Accipiter gentilis* (Tables 9 & 10)

The annual increase in the number of breeding Goshawk monitored in Scotland was maintained in 2011 (Table 9), reflecting a general increase in the population reported by field workers in the three main study areas, Northeast Scotland, Lothian & Borders and Dumfries & Galloway. However, with only a very small number of enthusiasts carrying out effective monitoring of this raptor in these areas and given that vast tracks of both lowland and upland forest elsewhere are never visited, it is likely the Scottish population is much larger than that reported here, possibly as many as 200 occupied home ranges. Home range checks were carried out at 158 known sites (Table 10), 132 (84%) were occupied, 116 (73%) by pairs and 16 (10%) by single birds — the highest proportions so far. Of the 110 pairs monitored, 89 (81%) were successful in rearing 212 young. The mean brood size per monitored pair was 1.9 young, a figure identical to the previous year, 2010.

3.7 Eurasian Sparrowhawk *Accipiter nisus* (Table 11)

There are two contrasting population studies in Scotland, a long running one in rural Ayrshire and a newer urban/suburban study in Edinburgh city. In 2011, the former had an occupancy rate of 60% compared with the city one of 73% (Table 11). Both studies reported high breeding success; Ayrshire 88% and Edinburgh 95%, though mean brood size per laying pair differed with 1.8 and 2.7 young respectively. Across Scotland 128 home ranges were checked and 97 (76%) were occupied by pairs. Effective monitoring was carried out at 89 occupied home ranges, a 46% increase over the 2010 figure and a welcome return to the 2009 level. Of these, 72 pairs (81%) bred successfully, rearing 177 young. Mean brood size was 2.0 young per pair occupied monitored home range.

3.8 Common Buzzard *Buteo buteo* (Tables 12 & 13)

The Common Buzzard now breeds throughout the whole of Scotland with the exception of Shetland, which has no voles and where it remains only a passage visitor (Holling 2007). Twenty-five years ago it was absent as a breeding species from most of eastern Scotland and the central lowlands, but, since the 1990s, buzzards have successfully re-colonised all areas from which they had been previously exterminated (Holling 2003). Common Buzzards have now spread to a wide range of habitats, with only the highest mountain peaks and most densely built-up urban areas avoided. The most recent estimate in 2007 gave a population estimate of 15,000–20,000 pairs (Holling 2007) but evidence from BTO/JNCC/RSPB Breeding Bird Survey trends and the forthcoming BTO/BirdWatch Ireland/SOC Bird Atlas 2007–11 suggests the population in Scotland is now considerably

greater than this. However, along with Hen Harrier, Common Buzzards have the dubious distinction of being amongst the most persecuted bird of prey species (Anon. 2012) and thus continued population monitoring of numbers and breeding success as carried out by the SRMS is very important. Coverage of this species by SRMS reached the highest level yet in 2011 with 989 known home ranges checked for occupancy and 747 having potential breeding pairs (Tables 12 & 13). Monitoring visits were made to 539 pairs and 490 were confirmed to lay eggs. Nesting success at 74% was similar to recent years with 398 pairs rearing 699 fledged young, a mean productivity of 1.3 young per monitored pair. A decline in the occupancy of home ranges since 2009 could be due to more accurate recording by field workers of the number of vacant territories visited rather than any decline in the population.

3.9 Golden Eagle *Aquila chrysaetos* (Tables 14 & 15)

The iconic Scottish bird, in recent years the Golden Eagle has attracted a considerable amount of publicity by the media and interest by biologists. Three previous surveys in 1982 (420 pairs; Dennis *et al.* 1984), 1992 (420 pairs, Green *1996*, later revised up to 439) and 2003 (442 pairs, Eaton *et al.* 2007) have shown stability in the number of territorial pairs. However, these figures hide marked changes in abundance in some regions. The most recent survey revealed an increase in the north and west Highlands and in the Outer Hebrides with a corresponding decline in the eastern Cairngorms and parts of Tayside. These declines were linked with increased persecution in grouse moor areas in the east, a factor affecting the populations of a number of raptor species in recent years (Whitfield *et al.* 2007). Annual monitoring of occupied home ranges has for several years represented over 50% of the 2003 population estimate and in 2011 reached 56% (Table 14). It is important that this level is maintained and improved in the build-up to the next national survey in 2015. Breeding success in 2011 was below average and similar to the poor years of 2005 and 2006 (Table 14). One in three pairs either did not make a breeding attempt or failed at an early stage, soon after eggs were laid (Table 15). Further pairs failed during incubation (21%) or at the chick stage (9%). If this sampling is broadly representative of the Scottish Golden Eagle population as a whole, the 108 young recorded suggest a Scottish productivity figure of just less than 200 young eagles in 2011. In recent years, satellite tagging of young Golden Eagles is beginning to demonstrate the scale of movements during their early nomadic years (e.g. www.raptortrack.org/) and their vulnerability to poisoned baits that are still widely used on some upland estates.

There is an error in the Table 12 of the 2010 SRMS report (Etheridge *et al.* 2012b) for the Angus glens. The correct figures are 8 home ranges checked, 5 home ranges occupied by pairs, 5 pairs monitored, 1 pair failed early or non-breeding, 4 pairs laid eggs, hatched eggs and fledged young, and 6 young successfully fledged.

3.10 Osprey *Pandion haliaetus* (Tables 16 & 17)

One of the most inspiring natural events of the mid-20th century was the return and re-colonisation of the Osprey as a breeding species. Sixty years after a pioneering pair chose to settle at Loch Garten, there are now over 200 pairs in Scotland, with a high proportion closely monitored by SRMS members. As the population has grown, it has become increasingly difficult for the small number of field workers interested in the species to effectively monitor all the breeding sites known to them and, almost certainly, undetected breeding pairs will exist. Compared to recent years, Ospreys had a very poor breeding season in 2011 (Table 16). Just over half of monitored pairs (51%) succeeded in fledging young, well below the average of 71% for the past 8 years and the first time it has dropped below 60%. Moreover, the production of young was poor with just 210 recorded and the mean brood size per monitored pair at 1.04 was the lowest so far recorded and a third down on recent years. Almost every region showed a decline in breeding success but it was particularly marked in Northeast and Central Scotland, Tayside and Argyll (Table 17). The poor breeding season was attributed to the exceptional weather conditions in late May when many nests were destroyed by gale force winds.

3.11 Common Kestrel *Falco tinnunculus* (Table 18)

The Common Kestrel is declining throughout the UK. In Scotland, the Breeding Bird Survey recorded a decline of 64% between 1994 and 2011 (Risely *et al.* 2012). However, the reasons behind this decline are not fully understood. There are an estimated 7,500–7,800 pairs breeding in Scotland (Riddle 2007), but in recent years less than 1% of this population has been monitored by the SRMS. However, a surge in reporting occurred in 2011 across most regions of Scotland (Table 18). This is a welcome development and one the SRMS must continue to encourage in future years if this widespread but declining species is to be effectively monitored by the scheme. During the spring, 212 nest sites were checked and pairs were present at 140 (66%). Ninety-five pairs received follow-up checks and 89 were confirmed to lay eggs. Hatching success (98%) and fledging success (97%) were both very high and 274 young fledged from 86 successful nests. The mean brood size per monitored pair was 2.9 young, identical to the 2010 figure.

3.12 Merlin *Falco columbarius* (Tables 19 & 20)

In Scotland, the majority of Merlin pairs nest on the ground in open heather moorland, a habit and habitat that makes the species and nest more accessible and therefore attractive to many field workers. The population lies in the region of 700–800 pairs (Ewing *et al.* 2011) and annually almost a fifth of this breeding population is monitored by SRMS. Table 19 shows the results of home range occupancy and breeding success over the past 9 years, 2003–2011. In the last two years there are indications of reduced occupation of known home ranges with a resultant drop in the number of breeding pairs monitored. There are no indications of reduced breeding success over the period 2003–2011. In the spring, 361 home ranges were checked, 201 (56%) showed signs of occupation and 168 (47%) pairs were present. Monitored pairs totalled 136 of which 16 (12%) failed at an early stage and a further 13 (10%) during incubation and chick rearing. The 107 successful pairs fledged a minimum

of 322 young – a mean brood size of 2.4 young per monitored pair (Table 20).

An error has been discovered in the 2009 SRMS report (Etheridge *et al.* 2012a). In Table 17, the sub-total for pairs monitored in Northeast Scotland should read 36 not 19. This effects the grand total at the bottom of the table that should read 145 not 128.

3.13 Eurasian Hobby *Falco subbuteo*

One home range in the Badenoch & Strathspey district of Highland that has been regularly occupied for the past 10 years again held a breeding pair of Hobby in 2011. Three young successfully fledged in late July. This is the most northerly nesting pair in the UK but the species is easily overlooked and further pairs undoubtedly exist in Scotland awaiting discovery. Any adult in suitable habitat during the May-August period is a possible breeding bird and further searches should be carried out concentrating on old crow nests in the vicinity, particularly during July and early August when young may be present in nests and adults more demonstrative.

3.14 Peregrine Falcon *Falco peregrinus* (Tables 21, 22 & 23)

Following recovery from the organochlorine pesticide era in the 1950s & 60s, when the Peregrine Falcon population sunk to an all-time low, Scottish numbers reached a peak in 1991 with 639 occupied territories (Crick & Radcliffe 1995) but have since shown some decline. In the last national survey year of 2002, there were an estimated 592 occupied territories (Banks *et al.* 2010). The direct killing of adult birds and the destruction of nests by game preservers and pigeon fanciers is still a threat throughout much of eastern and southern Scotland; the threat from illegal falconers and egg collectors is still present but thought to be declining. Pollutants such as PCBs and mercury could be affecting coastal breeding populations in the north and west Highlands through the seabird food chain, whilst habitat degradation in some upland areas has likely reduced the prey base. Table 21 shows territory occupation over the last nine years, 2003–2011, and reveals a steady decline during the earlier years with a slight increase in 2011. Figure 3 and Table 22 show home range occupancy and breeding success in relation to habitat and game management during 2011. Home ranges in the uplands had lower occupancy and breeding success than those on lower ground. Furthermore, home ranges situated on land subjected to game management or shooting were similarly affected, having lower occupancy and poorer breeding success than similar ground where shooting did not occur, findings reflecting those of Hardey *et al.* (2003). Land actively managed for game-birds, whether upland or in the lowlands, also held double the proportion of single birds holding territory as opposed to land where there was none. More detailed analyses of scheme data over a number of years to investigate differences in the success of Peregrines in different habitats in Scotland would be valuable.

In 2011, 590 home ranges were checked and there were signs of occupation at 351 (59%); 324 (55%) by pairs and 27 by single birds (Table 23). Follow up monitoring visits were carried out on 290 pairs. Of these 38 (13%) either failed at an early stage or were non-breeding, 81 pairs (28%) failed during incubation and a further six pairs (2%) failed with young. Two hundred and three pairs (70%) successfully reared 464 young giving a mean brood size per monitored pair of 1.6 young.

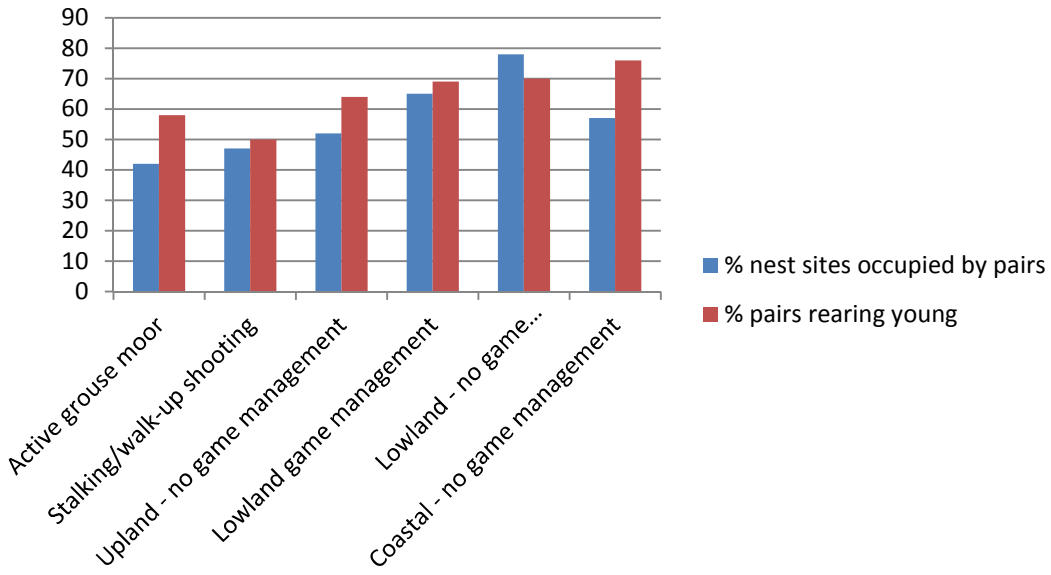

Figure 3. Peregrine Falcon home range occupancy and breeding success in upland and lowland Scotland subject to different levels of game management in 2011. Refer to Table 22 for sample sizes.

3.15 Barn Owl *Tyto alba* (Tables 24 & 25)

The winters of 2009/10 and 2010/11 were particularly severe, with prolonged daytime frosts and snow cover across the country. Originating from tropical regions, Barn Owls are not well adapted to intense cold and snow cover, suffering high mortality when these conditions prevail for prolonged periods. In 2011 the occupancy rate of known nest sites fell to a 9-year low of 55% (Table 24). However, the surviving pairs enjoyed an excellent breeding season with 98% of monitored pairs laying eggs and 95% of these laying birds producing young. Prolonged snow cover in late winter/early spring, as occurred in the winter of 2010/11, may have benefitted vole numbers by reducing the risk of predation and allowing their numbers to increase substantially. The surviving Barn Owls appear to have capitalised on this prey abundance once the snow had gone. Winter weather is most severe in upland areas and results from the 25-year study within the upland Glentrool Forest in Galloway by Geoff Shaw demonstrate the combined impact of two hard winters on this population. The provision of tree mounted nest boxes successfully increased the number of pairs from 10–12 in the late 1970s to a peak of 50–60 in the mid-1990s. However, severe winter weather since 2009 has caused high mortality, reducing the number of pairs to just six in 2011 (Shaw 2011).

3.16 Little Owl *Athene noctua*

Little owl is a scarce breeding bird in Scotland, with small numbers recorded in the Borders, Dumfries and Galloway and Lothian (Gordon 2007). Apart from a single pair in 2009 (Etheridge *et al.* 2012a), there are apparently no other breeding records for Scotland since 1990 (Gordon 2007). No records were submitted for this species in 2011.

3.17 Tawny Owl *Strix aluco* (Tables 26 & 27)

Almost all the sites checked in 2011 were nest boxes. The provision of boxes in suitable woodland will attract the resident Tawny Owl population away from traditional nest sites such as tree holes and old stick nests and may boost the number of pairs breeding where suitable nest sites are limited. There was improved coverage in 2011 in Tayside, Argyll and Lothian & Borders, resulting in the highest total of pairs monitored so far by the SRMS (Table 26). Breeding success and productivity, like that of Barn Owls, was better than average, again suggesting that prey abundance was the main driver. Two hundred and thirty-two nest sites were checked and pairs were present in 142 (61%). There were 130 laying pairs monitored, 112 (86%) reached the hatching stage and 104 (80%) fledged 193 young. Mean brood size per monitored pair was 1.5 young (Table 27).

3.18 Long-eared Owl *Asio otus* (Table 28)

There was a welcome increase in monitoring in 2011. Whether this was due to an increase in the number of pairs or an increase in effort by field workers is difficult to say. Of 46 known territories checked, 35 (76%) had signs of occupation. Twenty-six pairs were known to lay eggs and 24 (92%) succeeded in fledging young. Forty-seven young were counted, a mean brood size of 1.8 per laying pair.

3.19 Short-eared Owl *Asio flammeus* (Table 29)

Short-eared Owl pairs were found at 52 (71%) of the 73 known breeding sites visited in 2011, a figure only slightly lower than the 76% recorded in 2010. Thirty-six nests were found and monitored and 29 (81%) fledged young, giving a mean brood size of 2.2 per monitored nest, again down on the 2010 figure of 2.7.

3.20 Common Raven *Corvus corax* (Table 30)

The increasing numbers of Common Ravens in the uplands and their gradual re-colonisation of lowland agricultural land, mirroring a similar change in abundance of Common Buzzard, are for many a welcome natural change in the British countryside in recent decades. As with the buzzard, however, there are some interest groups that hold a different view and perceive the widespread return of ravens as a threat to either their livelihood or sport, and demand that the bird's legal protection is reduced. The SRMS hold a factual, unbiased and robust data set for the breeding of this species covering the last nine years, and as this monitoring develops further it will be of great value in any future debate over raven protection. After eight years of growth in the number of home ranges checked for occupation, in 2011 the total fell back to close to the 2009 level, much of it due to a reduction in reporting in Lewis & Harris. Visits were made to 465 home ranges and 393 (85%) were occupied by Common Raven

pairs. Follow up visits were made to 321. Thirty-three pairs (10%) did not breed or failed either during egg laying or soon after. A further 20 (6%) failed during incubation but there were only four failures (1%) during the chick stage, a figure the same as 2010. Overall, 264 pairs (82%) succeeded in rearing at least one chick to fledging. A minimum of 725 fledged young was counted, giving a mean brood size per monitored pair of 2.3.

4 Acknowledgements

The Scottish Raptor Monitoring Scheme is supported by a grant from Scottish Natural Heritage for which we are extremely grateful. Special thanks go to members of the Scottish Raptor Study Groups who supplied much of the information on which this report is based. Further data came from the Rare Breeding Birds Panel, commissioned surveys by Scottish Natural Heritage, general survey work by Natural Research Ltd and RPS Group, and long term species monitoring programmes by Forestry Commission Scotland and RSPB Scotland, all of which we gratefully acknowledge. For this 2011 report, we are grateful to Anne Carrington-Cotton and Andy Dobson (BTO Scotland) for assistance with data checking and processing. We also thank Keith Kirk for the superb cover photograph of a Barn Owl and other images throughout the report, and Mike Henry for the beautiful line drawing of a red kite on the title page.

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This publication should be cited as follows:

Etheridge, B., Riley, H.T., Wernham, C.V., Holling, M., & Stevenson, A. (2013). Scottish Raptor Monitoring Scheme Report 2011. Scottish Raptor Study Groups, Inverness.

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6 Tables

Table 1. Scottish Raptor Monitoring Scheme: home ranges checked and monitored, 2003–2011.

Year	Home ranges checked	Annual change	Occupied home ranges monitored	Annual change
2003	3483		2406	
2004	3488	+0.1	2277	-5.4
2005	3618	+3.7	2289	+0.5
2006	4006	+10.7	2525	+10.3
2007	4284	+6.9	2614	+3.5
2008	4606	+7.5	2800	+7.1
2009	4472	-2.9	2592	-7.4
2010	4811	+7.6	2824	+9.0
2011	5246	+9.0	3011	+6.6

Table 2. Population growth and breeding success of Red Kites in Scotland, 1992–2011.

Year [1]	Pairs laying eggs	Pairs fledging young	Total young fledged	% of pairs that fledged young	Productivity: young laying pair
1992	1	1	1	100	1.00
1993	5	3	7	60	1.40
1994	8	7	13	88	1.63
1995	15	11	26	73	1.73
1996	17	16	39	94	2.29
1997	23	19	39	83	1.70
1998	25	22	49	88	1.96
1999	34	27	59	79	1.74
2000	39	35	86	90	2.21
2001	43	38	95	88	2.21
2002	50	43	112	86	2.24
2003	54	48	106	89	1.96
2004	60	49	115	82	1.92
2005	76	61	131	80	1.72
2006	84	69	151	82	1.80
2007	93	73	162	78	1.74
2008	121	97	210	80	1.74
2009	152	113	235	74	1.55
2010	162	134	293	83	1.81
2011	185	155	313	84	1.69
TOTAL	**1247**	**1021**	**2242**	**82**	**1.80**

[1] Breeding in North Scotland started in 1992, in Central Scotland in 1998, in Dumfries & Galloway in 2003 and in Aberdeen in 2008.
The mean values given for the final columns are the unweighted means, i.e. the sample size for each year has not been taken into consideration.

Table 3. Breeding success of Red Kites on Scotland in 2011.

Region	Home ranges checked	Pairs located	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Highland								
Black Isle	43	31	31	1	30	28	28	59
Easter Ross	35	21	20	0	20	18	16	41
Inverness-shire	6	4	4	0	4	4	4	8
sub-total	**84**	**56**	**55**	**1**	**54**	**50**	**48**	**108**
Northeast Scotland	**21**	**15**	**15**	**0**	**15**	**14**	**14**	**28**
Central Scotland	**56**	**23**	**22**	**1**	**21**	**18**	**11**	**21**
Tayside	**56**	**37**	**37**	**0**	**37**	**31**	**29**	**55**
Dumfries & Galloway	**62**	**60**	**60**	**2**	**58**	**53**	**53**	**101**
Grand total	**279**	**191**	**189**	**4**	**185**	**166**	**155**	**313**

Table 4. White-tailed Eagle breeding success and productivity in Scotland, 1996–2011.

Year	Territorial pairs monitored	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Total young fledged	Young fledged per laying pair	Young fledged per territorial pair
1996	12	12	8	7	9	0.75	0.75
1997	14	11	6	5	9	0.82	0.64
1998	19	16	9	9	13	0.81	0.68
1999	20	16	9	6	11	0.69	0.55
2000	22	19	12	8	12	0.63	0.55
2001	23	17	10	7	11	0.65	0.48
2002	25	22	14	8	12	0.55	0.48
2003	31	25	20	16	26	1.04	0.84
2004	32	28	19	15	19	0.68	0.59
2005	33	28	21	17	24	0.86	0.73
2006	36	31	25	21	29	0.94	0.81
2007	42	35	31	24	34	0.97	0.81
2008	44	35	21	20	28	0.80	0.64
2009	46	39	31	24	36	0.92	0.78
2010	52	47	34	33	46	0.98	0.88
2011	57	49	38	33	43	0.88	0.75
Total	**508**	**430**	**308**	**253**	**362**	**0.84**	**0.71**

Table 5. Breeding success of White-tailed Eagles in Scotland in 2011.

Study area	Confirmed occupied by pairs	Nest built up	Incubation confirmed	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Western Isles	15	15	14	11	10	14
NW Highlands	5	5	5	5	5	5
Skye, Lochalsh & Small Isles	15	14	11	7	7	11
Lochaber and mainland Argyll	6	6	5	4	2	2
Argyll islands	16	16	14	11	9	11
Grand total	**57**	**56**	**49**	**38**	**33**	43

Table 6. Breeding success and productivity of Western Marsh Harriers in Scotland, 2003–2011.

Year	Pairs located	pairs laying eggs	Pairs fledging young	Minimum number of young fledged
2003	6	6	5	17
2004	8	5	5	15
2005	9	6	5	17
2006	9	7	7	20
2007	8	5	2	3
2008	4	4	2	3
2009	6	3	3	10
2010	4*	4*	4*	11
2011	5	5	4	10

*one male in 2010 was polygamous

Table 7. Home range occupancy and breeding success of Hen Harriers in Scotland, 2003-2011.

Year	Home ranges checked	Home ranges occupied by pairs	%	Monitored pair occupied home ranges	Pairs known to lay eggs	%*	Pairs known to fledge young	%*	Minimum number of young fledged	Mean brood size per success-ful nest	Mean brood size per pair laying	Mean brood size per monitored occupied home range
2003	379	335	88	303	271	89	171	56	529	3.1	2.0	1.7
2004	457	417	91	359	236	91	219	61	630	2.9	1.9	1.8
2005	395	342	87	310	268	86	175	56	466	2.7	1.7	1.5
2006	428	355	83	278	223	80	144	52	381	2.6	1.5	1.4
2007	415	298	72	253	213	84	147	58	432	2.9	2.0	1.7
2008	422	311	74	311	232	75	128	41	370	2.9	1.6	1.2
2009	365	232	64	208	162	78	108	52	326	3.0	2.0	1.6
2010	383	240	63	222	182	82	108	49	303	2.8	1.7	1.4
2011	490	267	54	246	186	76	111	45	291	2.6	1.6	1.2

* expressed as a percentage of monitored pair occupied home ranges

Table 8 . Breeding success of Hen Harriers in Scotland in 2011.

Region*	Home ranges checked	Home ranges occupied by pairs	Occupied home ranges monitored	Pairs failing early or non-breeding	Pairs known to lay eggs	Pairs known to hatch eggs	Pairs known to fledge young	Minimum number of young fledged
Orkney								
West Mainland	93	82	82	29	53	30	26	59
East Mainland	14	14	11	6	5	5	5	13
Rousay	7	7	5	3	2	1	1	2
Hoy	21	17	16	6	11	7	6	16
Sub-total	**135**	**120**	**114**	**44**	**71**	**43**	**38**	**90**
Hebrides								
North Uist	1	1	1	0	1	1	1	2
Benbecula	1	1	1	0	1	1	1	5
South Uist	8	8	8	2	6	6	6	13
Skye, Rum & Eigg	26	17	17	2	15	12	9	21
Sub-total	**36**	**27**	**27**	**4**	**23**	**20**	**17**	**41**
North Highlands								
Sutherland	16	9	9	0	9	8	6	17
Inverness	14	6	6	1	5	3	2	5
Sub-total	**30**	**15**	**15**	**1**	**14**	**11**	**8**	**22**
East Highlands								
Moray	16	4	4	0	4	3	2	7
Aberdeen	8	1	1	0	1	1	1	4
Angus	31	0	0	0	0	0	0	0
Perthshire	56	31	29	3	26	20	17	48
Sub-total	**111**	**36**	**34**	**3**	**31**	**24**	**20**	**59**
West Highlands & Islands								
Central	12	4	3	0	3	2	2	6
Kintyre & mid-Argyll	13	8	4	0	4	2	2	5
Cowal & Bute	14	5	5	4	1	1	1	4
Islay & Colonsay	12	7	7	1	6	5	4	12
Mull	38	18	11	0	11	11	11	22
Sub-total	**89**	**42**	**30**	**5**	**25**	**21**	**20**	**49**
Southwest & Southern Uplands								
South Strathclyde	73	14	14	2	12	6	3	11
Lothian & Borders	5	3	3	1	2	2	2	5
Dumfries & Galloway	11	10	9	1	8	5	3	14
Sub-total	**89**	**27**	**26**	**4**	**22**	**13**	**8**	**30**
Grand total	**490**	**267**	**246**	**61**	**186**	**132**	**111**	**291**

*For this species, the regions reported are those used to summarise the findings of national surveys carried out in 1988/89, 1994, 2004 and 2010 (Figure 4)

Table 9. Home range occupancy and breeding success of Northern Goshawks in Scotland, 2003–11.

Year	Home ranges checked	Home ranges occupied by pairs	%	Pairs known to lay eggs	Pairs known to fledge young	%	Minimum number of young fledged
2003	117	84	72	62	52	84	121
2004	132	86	65	67	60	90	126
2005	116	81	70	58	47	81	117
2006	116	78	67	60	48	80	108
2007	136	87	64	70	60	86	127
2008	139	89	64	70	61	87	163
2009	128	85	66	77	68	88	167
2010	143	97	68	92	75	82	182
2011	158	116	73	102	89	87	212

Table 10. Breeding success of Northern Goshawks in Scotland in 2011

Region	Home ranges checked	Home ranges occupied by pairs	Further home ranges in use[1]	Home ranges monitored	Pairs failing early or non-breeding	Pairs known to lay eggs	Pairs known to hatch eggs	Pairs known to fledge young	Mini-mum number of young fledged
Highland	4	2	1	2	1	1	0	0	0
Northeast Scotland	57	48	0	47	1	46	43	41	93
Tayside	16	8	6	6	2	4	4	4	11
Central Scotland	4	2	1	1	0	1	1	1	4
South Strathclyde	2	2	0	2	0	2	2	2	6
Lothian & Borders	55	36	8	34	1	33	28	26	63
Dumfries & Galloway	20	18	0	18	3	15	15	15	35
Grand total	**158**	**116**	**16**	**110**	**8**	**102**	**93**	**89**	**212**

[1] Fresh signs or single birds recorded

Table 11. Breeding success of Eurasian Sparrowhawks in Scotland in 2011.

Region	Home ranges checked	Home ranges occupied by pairs	Home ranges monitored	Pairs failing early or non-breeding	Pairs known to lay eggs	Pairs known to hatch eggs	Pairs known to fledge young	Minimum number of young fledged
Orkney	18	11	8	0	8	7	7	17
Highland	5	5	5	1	4	4	4	13
Tayside	8	8	8	2	6	6	6	10
Central Scotland	8	8	8	0	8	8	8	29
Argyll								
Islands	4	3	0	-	-	-	-	-
Mainland	6	6	6	0	6	6	6	10
South Strathclyde								
Ayrshire study	30	18	16	0	16	14	14	28
Lothian & Borders								
Edinburgh city study	41	30	30	9	21	20	20	57
other records	8	8	8	1	7	7	7	13
Grand total	**128**	**97**	**89**	**13**	**76**	**72**	**72**	**177**

Table 12. Home range occupancy and breeding success of Common Buzzards in Scotland, 2003–2011.

Year	Home ranges checked	Home ranges occupied by pairs	%	Pair occupied home ranges monitored	Pairs known to lay eggs	%*	Pairs fledging young	%*	Minimum number of young fledged	Mean brood size per pair laying	Mean brood size per monitored occupied home range
2003	342	298	87	270	246	91	209	77	435	1.8	1.6
2004	388	338	87	285	279	98	240	84	505	1.8	1.8
2005	418	349	83	273	261	96	218	80	377	1.4	1.4
2006	499	416	83	337	300	89	251	74	475	1.6	1.4
2007	652	528	81	410	360	88	307	75	590	1.6	1.4
2008	742	627	85	409	346	85	311	76	546	1.6	1.3
2009	660	491	74	382	325	85	275	72	476	1.5	1.2
2010	913	672	74	495	443	89	400	81	674	1.5	1.4
2011	989	747	76	539	490	91	398	74	699	1.4	1.3

* expressed as a percentage of monitored pair occupied home range.

Table 13. Breeding success of Common Buzzards in Scotland in 2011.

Region	Home ranges checked	Home ranges occupied by pairs	Home ranges occupied by single birds	Pairs monitored	Pairs failing early or non-breeding	Pairs known to lay eggs	Pairs known to hatch eggs	Pairs known to fledge young	Minimum number of young fledged
Orkney	**10**	**6**	**0**	**6**	**0**	**6**	**6**	**5**	**13**
Lewis & Harris	**9**	**9**	**0**	**5**	**0**	**5**	**5**	**5**	**9**
Uist	**11**	**11**	**0**	**11**	**5**	**6**	**6**	**6**	**9**
Highlands									
Eigg	9	9	0	9	1	8	8	8	14
Caithness & Sutherland	31	26	1	20	3	17	14	14	26
Ross-shire	77	49	0	49	7	42	30	30	60
Badenoch & Strathspey	13	13	0	13	0	13	13	13	29
Sub-total	**130**	**97**	**1**	**91**	**11**	**80**	**65**	**65**	**129**
North-east Scotland	**180**	**166**	**[0]**	**[63]**	**[0]**	**63**	**[57]**	**57**	**95**
Tayside & Fife									
Perthshire	19	19	0	15	0	15	13	13	23
Strathallan study	95	59	8	42	0	42	31	31	45
Fife	22	2	19	17	1	16	14	14	21
Sub-total	**136**	**80**	**27**	**74**	**1**	**73**	**58**	**58**	**89**
Central Scotland									
N Lanarkshire	30	30	0	28	3	25	24	20	35
Falkirk	32	21	7	9	0	9	9	9	17
Stirling study*	182	152	3	119	19	100	66	59	82
Sub-total	**244**	**203**	**10**	**156**	**22**	**134**	**99**	**88**	**134**
Argyll									
Tiree, Mull & Coll	13	13	0	3	0	3	3	3	5
Colonsay	58	14	3	14	7	7	4	4	5
Islay	6	6	0	6	0	6	5	5	7
Cowal	29	28	0	5	0	5	5	5	10
Bute	55	16	9	13	2	11	11	11	15
Kintyre	5	5	0	5	0	5	4	4	7
Sub-total	**166**	**82**	**12**	**46**	**9**	**37**	**32**	**32**	**49**
Lothian & Borders									
Lothian	36	32	1	30	0	30	27	27	65
Borders	18	16	1	15	1	14	14	13	30
Sub-total	**54**	**48**	**2**	**45**	**1**	**44**	**41**	**40**	**95**
South Strathclyde	**10**	**9**	**0**	**8**	**0**	**8**	**8**	**8**	**10**
Dumfries & Galloway	**39**	**36**	**1**	**34**	**0**	**34**	**34**	**34**	**67**
Grand total	**989**	**747**	**53**	**539**	**49**	**490**	**411**	**398**	**699**

Figures in square brackets were not provided. Therefore a minimum figure is used.

Table 14. Home range occupancy and breeding success of Golden Eagles in Scotland, 2004–2011.

Year	Home ranges checked	Home ranges occupied by pairs	%	Further home ranges in use[1]	Pairs monitored	Pairs known to fledge young	%	Minimum number of young fledged	Mean brood size per successful pair	Mean brood size per monitored pair
2004	232	175	75	19	151	81	54	97	1.20	0.64
2005	264	220	83	19	207	72	35	88	1.22	0.43
2006	290	233	80	27	218	78	36	84	1.08	0.39
2007	291	227	78	26	216	92	43	104	1.13	0.48
2008	310	242	78	28	224	111	50	123	1.11	0.55
2009	307	242	79	28	232	95	41	111	1.17	0.48
2010[2]	344	264	77	36	247	111	45	134	1.21	0.54
2011	345	280	81	26	247	91	37	108	1.19	0.44

[1] Additional home ranges occupied by single birds or showing signs of occupation but no pair seen.
[2] Amended totals from 2010 SRMS report.

Table 15. Breeding success of Golden Eagles in Scotland in 2011.

Region	Home ranges checked	Home ranges occupied by pairs	Of which im-mature pairs[1]	Further home ranges in use[2]	Pairs monit-ored	Failed early or non-breeding	Pairs laying eggs	Pairs hatch-ing eggs	Pairs fledging young	Minimum number of young fledged
Lewis & Harris										
Lewis	12	12	0	0	11	2	9	4	4	4
Harris	20	20	0	0	20	4	16	7	7	7
Sub-total	**32**	**32**	**0**	**0**	**31**	**6**	**25**	**11**	**11**	**11**
Uists										
North Uist	7	7	0	0	4	1	3	3	2	2
Benbecula	2	2	0	0	2	0	2	1	1	1
South Uist	2	2	0	0	2	1	1	1	1	1
Barra	3	3	1	0	3	1	2	2	1	1
Sub-total	**14**	**14**	**1**	**0**	**11**	**3**	**8**	**7**	**5**	**5**
Highland										
Sutherland	36	22	0	5	15	7	8	4	4	4
Wester Ross	25	18	2	4	14	7	7	5	5	7
Easter Ross	6	5	1	1	5	2	3	3	2	3
Skye	34	29	0	0	29	5	24	15	10	10
Rum, Canna & Eigg	6	6	0	0	6	1	5	3	3	5
Ardnamurchan, Morvern & Sunart	23	23	3	0	22	7	15	8	3	3
West Inverness	16	10	2	2	6	1	5	4	2	3
East Inverness	15	8	2	5	8	3	5	4	3	4
Badenoch	13	12	4	1	12	5	7	6	5	7
Sub-total	**174**	**133**	**14**	**18**	**117**	**38**	**79**	**52**	**37**	**46**
Northeast Scotland	**19**	**16**	**0**	**0**	**12**	**3**	**9**	**7**	**7**	**9**
Tayside										
Perthshire west of A9 road	17	11	1	3	9	3	6	6	5	7
Perthshire east of A9 road	5	5	0	0	5	0	5	3	3	3
Angus glens	10	6	0	1	4	0	4	4	4	7
Sub-total	**32**	**22**	**1**	**4**	**18**	**3**	**15**	**13**	**12**	**17**
Central Scotland	**5**	**5**	**0**	**0**	**5**	**3**	**2**	**2**	**1**	**1**
Argyll										
Lochaber & north Argyll	7	3	1	1	1	0	1	1	1	1
South Argyll	23	20	1	1	20	9	11	9	8	8
Mull & Colonsay	34	33	1	0	30	16	14	11	9	10
Sub-total	**64**	**56**	**3**	**2**	**51**	**25**	**26**	**21**	**18**	**19**
Lothian & Borders	**3**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Dumfries & Galloway	**2**	**2**	**1**	**0**	**2**	**1**	**1**	**0**	**0**	**0**
Grand total	**345**	**280**	**20**	**26**	**247**	**82**	**165**	**113**	**91**	**108**

[1] These immature pairs are included in the column 'Home ranges occupied by pairs'. For the purpose of this report, we regard pairs consisting of either one or two birds with immature plumage as immature pairs.
[2] Additional home ranges occupied by single birds or showing signs of occupation but no pair seen.

Table 16. Home range occupancy and breeding success of Ospreys in Scotland, 2003–2011.

Year	Home ranges checked	Home ranges occupied by pairs	%	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs known to fledge young	%	Minimum number of young fledged	Mean brood size per successful nest	Mean brood size per monitored pair
2003	232	162	70%	[162]	[22]	140	109	67%	229	2.1	1.41
2004	230	182	79%	[182]	[27]	155	114	63%	233	2.04	1.28
2005	239	180	75%	[180]	[22]	158	124	69%	242	1.95	1.34
2006	206	155	75%	[155]	[12]	143	111	72%	225	2.03	1.45
2007	198	140	71%	138	19	119	92	67%	182	1.98	1.32
2008	>211	208-211	-	204	31	173	148-149	73%	303	2.04	1.49
2009	209	168	80%	166	10	156	130	78%	259	1.99	1.56
2010	229	193	84%	190	24	166	144	76%	306	2.13	1.61
2011	260	202	78%	201	28	173	104	52%	210	2.02	1.04

Table 17. Breeding success of Ospreys in Scotland in 2011.

Region	Breeding sites checked	Pairs present	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Highland								
Sutherland	10	10	10	0	10	9	7	14
Ross-shire	28	20	20	4	16	14	11	23
Inverness-shire	17	13	13	1	12	11	11	19
Moray & Nairn	18	16	16	3	13	12	11	25
Badenoch & Strathspey	13	10	10	0	10	6	4	8
sub-total	**86**	**69**	**69**	**8**	**61**	**52**	**44**	**89**
North-east Scotland	**26**	**23**	**23**	**5**	**18**	**8**	**8**	**15**
Tayside								
Angus	10	8	8	1	7	5	5	8
Perthshire	56	44	43	3	40	17	17	34
sub-total	**65**	**52**	**51**	**4**	**47**	**22**	**22**	**42**
Central Scotland	**32**	**23**	**23**	**4**	**19**	**10**	**10**	**20**
Argyll	**25**	**15**	**15**	**1**	**14**	**6**	**6**	**13**
South Strathclyde	**5**	**4**	**4**	**2**	**2**	**2**	**2**	**3**
Lothian & Borders	**10**	**9**	**9**	**1**	**8**	**8**	**8**	**20**
Dumfries & Galloway	**11**	**7**	**7**	**3**	**4**	**4**	**4**	**8**
Grand total	**260**	**202**	**201**	**28**	**173**	**112**	**104**	**210**

Table 18. Breeding success of Common Kestrels in Scotland in 2011.

Region	Nest sites checked	Pairs present	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Orkney	17	17	11	0	11	11	11	31
Highland	11	8	7	0	7	7	7	28
Isle of Eigg	5	5	4	0	4	4	4	5
Tayside	49	36	20	0	20	20	20	57
Central Scotland	36	17	12	3	9	9	8	28
Argyll	14	11	2	0	2	2	2	4
South Strathclyde	45	28	23	2	21	19	19	63
Lothain & Borders	19	13	12	1	11	11	11	47
Dumfries & Galloway	16	5	4	0	4	4	4	11
Grand total	**212**	**140**	**95**	**6**	**89**	**87**	**86**	**274**

Table 19. Home range occupancy and breeding success of Merlins in Scotland, 2003-2011.

Year	Home ranges check-ed	Home ranges with signs of occupation	%	Pair occupied monitored home ranges	Pairs known to lay eggs	%*	Pairs fledging young	%*	Minimum number of young fledged	Mean brood size per pair laying	Mean brood size per pair occupied monitored home range
2003	387	242 [1]	63%	[190]	190	-	141	-	476	2.5	-
2004	403	254 [1]	63%	[175]	175	-	115	-	319	1.8	-
2005	409	290	71%	[189]	189	-	156	-	500	2.6	-
2006	462	285	62%	189	171	90%	133	70%	402	2.4	2.1
2007	397	262	66%	168	157	93%	128	76%	403	2.6	2.4
2008 [2]	513	314	61%	209	187	89%	142	68%	433	2.3	2.1
2009	318	204	64%	145 [3]	126	87%	112	77%	353	2.8	2.4
2010	400	201	50%	133	127	95%	113	85%	335	2.6	2.5
2011	361	201	56%	136	120	88%	107	79%	322	2.7	2.4

[*] % of pair occupied monitored home ranges
[1] Figures refer to home ranges occupied by pairs, a slightly lower figure than those showing signs of occupation.
[2] 2008 was the year of a National Merlin Survey, resulting in improved coverage.
[3] Corrected figure from 2008 report

Table 20. Breeding success of Merlins in Scotland in 2011.

Region	Home ranges checked	Home ranges with signs of occupation[1]	Home ranges occupied by pairs	Pairs monitored	Failed early or non-breeding	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Orkney									
West Mainland	13	7	4	4	2	2	2	2	7
East Mainland	2	2	2	2	0	2	1	1	1
Rousay	1	1	1	1	1	0	0	0	0
Hoy	15	3	1	1	0	1	1	1	4
Sub-total	**31**	**13**	**8**	**8**	**3**	**5**	**4**	**4**	**12**
Lewis & Harris	**3**	**3**	**3**	**2**	**0**	**2**	**2**	**2**	**4**
Uists	**4**	**4**	**4**	**3**	**0**	**3**	**3**	**3**	**9**
Highland									
Isle of Rum	4	4	3	3	0	3	3	3	8
Ross-shire/Sutherland	23	20	18	11	0	11	9	8	25
Inverness/Badenoch	3	2	2	1	0	1	1	1	4
West Moray/Nairn	27	7	6	6	3	3	3	3	10
Sub-total	**57**	**33**	**29**	**21**	**3**	**18**	**16**	**15**	**47**
Northeast Scotland									
East Moray	23	12	9	8	2	6	6	6	15
Lower Deeside	27	5	4	4	0	4	3	3	10
Mid/upper Deeside	35	19	17	16	0	16	15	14	43
Donside	17	8	7	7	0	7	5	5	14
Sub-total	**102**	**44**	**37**	**35**	**2**	**33**	**29**	**28**	**82**
Tayside									
Perthshire	39	26	22	16	5	11	11	11	32
Angus	29	18	14	13	0	13	13	12	33
Sub-total	**68**	**44**	**36**	**29**	**5**	**24**	**24**	**23**	**65**
Central Scotland	**12**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Argyll	**4**	**4**	**4**	**1**	**0**	**1**	**1**	**1**	**4**
South Strathclyde	**12**	**11**	**11**	**11**	**1**	**10**	**10**	**10**	**33**
Lothian & Borders									
Moorfoot Hills	4	0	0	0	0	0	0	0	0
Lammermuir Hills	24	10	9	8	0	8	8	8	31
Pentland Hills	13	6	2	2	0	2	2	2	5
South of River Tweed	14	14	11	7	2	5	5	4	12
Sub-total	**55**	**30**	**22**	**17**	**2**	**15**	**15**	**14**	**48**
Dumfries & Galloway	**13**	**13**	**12**	**9**	**0**	**9**	**8**	**7**	**18**
Grand total	**361**	**201**	**168**	**136**	**16**	**120**	**112**	**107**	**322**

[1]The number of home ranges that were occupied by pairs and single birds plus the number of home ranges where fresh signs of Merlins were observed.

Table 21. Home range occupancy of Peregrine Falcons in Scotland, 2003–2011.

Year	Home ranges checked	Number occupied	%	Pairs recorded	%	Single birds recorded	%
2003	595	402	67.6	-	-	-	-
2004	579	406	70.1	375	64.8	31	5.4
2005	572	384	67.1	353	61.7	31	5.4
2006	595	391	65.7	352	59.2	39	6.6
2007	633	385	60.8	338	53.4	47	7.4
2008	597	344	57.6	317	53.1	27	4.5
2009	529	303	57.3	272	51.4	31	5.9
2010	554	313	56.5	280	50.5	33	6
2011*	524	318	60.7	291	55.5	27	5.2

*The Northeast Scotland total from Table 23 has been deleted from these figures as the 'Home Ranges Checked' figure was not supplied.

Table 22. Occupancy and breeding success of Peregrine Falcons in habitats subjected different levels of game management in 2011

Management	Habitat	Home ranges checked	Home ranges occupied	Single birds present	Pairs present	Pairs monitored	Pairs rearing young	Minimum number of young fledged	Mean brood per monitored pair
Active grouse moor	Upland farm & moorland	136	57 (42%)	8 (6%)	49 (36%)	40	23 (58%)	56	1.4
Stalking/walk-up shooting	Upland farm & moorland	30	14 (47%)	1 (3%)	13 (43%)	12	6 (50%)	13	1
No game management	Upland farm & moorland	92	48 (52%)	4 (4%)	44 (48%)	44	28 (64%)	61	1.4
Total		**258**	**119 (46%)**	**13 (5%)**	**106 (41%)**	**96**	**57 (59%)**	**130**	**1.4**
Active game management	Lowland farmland	26	17 (65%)	3 (12%)	14 (54%)	13	9 (69%)	23	1.8
No game management	Lowland farmland	32	27 (84%)	0	27 (84%)	27	20 (74%)	45	1.7
No game management	Urban & industrial	37	28 (76%)	1 (3%)	27 (73%)	26	17 (65%)	46	1.8
No game management	Coastal & sea-cliff	116	71 (61%)	5 (4%)	66 (57%)	62	47 (76%)	116	1.9
Total		**211**	**143 (68%)**	**9 (4%)**	**134 (64%)**	**128**	**93 (73%)**	**230**	**1.8**

Table 23. Breeding success of Peregrine Falcons in Scotland in 2011.

Region	Home ranges checked	Home ranges occupied by single birds	Home ranges occupied by pairs	Pairs monitored	Pairs failing early or non-breeding	Pairs laying eggs	Pairs hatching young	Pairs fledging young	Minimum number of young fledged
Orkney									
Mainland	4	1	3	3	0	3	3	3	7
Hoy	8	3	3	2	0	2	2	2	3
other islands	1	0	1	1	0	1	1	1	4
Sub-total	**13**	**4**	**7**	**6**	**0**	**6**	**6**	**6**	**14**
Lewis & Harris	**3**	**0**	**3**	**1**	**0**	**1**	**1**	**1**	**2**
Uist	**6**	**0**	**5**	**5**	**0**	**5**	**5**	**5**	**13**
Highland									
Sutherland/Caithness	9	0	5	4	0	4	4	4	8
Easter Ross	8	1	3	3	0	3	2	2	4
Inverness	12	0	4	4	0	4	4	4	10
Isle of Canna	1	0	1	1	0	1	0	0	0
sub-total	**30**	**1**	**13**	**12**	**0**	**12**	**10**	**10**	**22**
North-east Scotland	**[33]**	**[0]**	**33**	**[18]**	**[0]**	**18**	**17**	**17**	**32**
Tayside & Fife									
west of A9 and M90	50	3	27	25	4	21	20	20	42
east of A9 and M90	24	0	13	12	1	11	9	9	17
Angus upland	35	1	13	9	1	8	3	3	5
Angus coastal plain	10	0	6	6	1	5	4	4	11
sub-total	**119**	**4**	**59**	**52**	**7**	**45**	**36**	**36**	**75**
Central Scotland	**37**	**3**	**26**	**23**	**2**	**21**	**16**	**15**	**27**
Argyll									
mainland	15	2	9	8	2	6	5	5	9
islands	15	1	12	11	4	7	6	4	5
sub-total	**30**	**3**	**21**	**19**	**6**	**13**	**11**	**9**	**14**
South Strathclyde									
upland/ moorland	28	2	8	8	1	7	4	4	9
lowland/industrial	13	0	11	0	3	8	6	4	10
coast	11	2	9	9	2	7	6	5	12
Isle of Arran	5	0	5	4	0	4	3	3	6
sub-total	**57**	**4**	**33**	**21**	**6**	**26**	**19**	**16**	**37**
Lothian & Borders									
heather moorland	33	4	10	10	2	8	6	6	18
upland sheep walk	21	1	6	6	1	5	4	4	10
lowland farmland	29	1	19	19	3	16	13	13	34
urban/industrial	12	1	10	10	4	6	6	6	19
sea-cliff/coast	55	0	19	19	1	18	17	17	53
sub-total	**150**	**7**	**64**	**64**	**11**	**53**	**46**	**46**	**134**
Dumfries & Galloway									
West Wigtown coast	23	0	19	18	2	16	13	13	28
Stewartry coast	10	0	9	9	0	9	8	8	13
Moffat and Eskdale inland	20	0	10	9	1	8	8	8	24
Nithsdale upland	26	1	7	7	2	5	2	2	5
Galloway inland	33	0	15	15	1	14	11	11	24
sub-total	**112**	**1**	**60**	**58**	**6**	**52**	**42**	**42**	**94**
TOTAL	**590**	**27**	**324**	**290**	**38**	**252**	**209**	**203**	**464**

Figures in square brackets were not provided. A minimum figure is therefore used.

Table 24. Nest site occupancy and breeding success of Scottish Barn Owls, 2003–2011.

Year	Nesting sites checked	Occupied by pairs	% of those checked	Pairs monitor-ed	Pairs laying eggs	% of those monitored	Pairs fledging young	Breeding success: % of those laying	Minimum number of young fledged	Mean brood size per laying pair
2003	260	238	92	-	226	-	209	92	656	2.9
2004	279	252	90	-	226	-	197	87	535	2.37
2005	316	253	80	-	204	-	160	78	433	2.12
2006	368	278	76	267	249	93	215	86	591	2.37
2007	474	391	82	374	352	94	320	91	1032	2.93
2008	524	409	78	369	340	92	276	81	688	2.02
2009	579	337	58	308	290	94	262	90	795	2.74
2010	545	347	64	330	312	95	285	91	919	2.94
2011	551	301	55	288	283	98	269	95	809	2.86

Table 25. Breeding success of Barn Owls in Scotland in 2011.

Region	Nesting sites checked	Occup-ied by pairs	Occup-ied by single birds	Pairs monitor-ed	Failed early or non-breeding	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Highland									
Sutherland & Caithness	3	1	0	1	0	1	1	1	5
Ross-shire	3	2	0	2	0	2	2	2	7
Inverness & Badenoch	3	3	0	3	0	3	3	3	11
Sub-total	**9**	**6**	**0**	**6**	**0**	**6**	**6**	**6**	**23**
Northeast Scotland	**27**	**11**	**1**	**10**	**0**	**10**	**10**	**10**	**35**
Tayside	**3**	**2**	**1**	**2**	**0**	**2**	**2**	**2**	**8**
Central Scotland									
Clackmannan & Falkirk	6	6	0	6	0	6	6	6	21
Stirling	18	12	0	12	0	12	12	11	45
West Dunbarton	7	7	0	7	0	7	7	7	12
Sub-total	**31**	**25**	**0**	**25**	**0**	**25**	**25**	**24**	**78**
Argyll									
Islay & Mull	6	4	0	4	0	4	4	4	6
Cowal & Bute	22	17	0	14	0	14	13	12	31
Knapdale & Kintyre	50	32	4	26	0	25	23	22	68
Sub-total	**78**	**53**	**4**	**44**	**0**	**43**	**40**	**38**	**105**
South Strathclyde									
East Ayrshire	37	23	6	23	0	23	23	22	56
South Ayrshire	15	7	2	7	1	6	6	6	12
Sub-total	**52**	**30**	**8**	**30**	**1**	**29**	**29**	**28**	**68**
Lothian & Borders	**56**	**21**	**5**	**21**	**0**	**21**	**21**	**21**	**72**
Dumfries & Galloway									
Galloway Forest uplands	90	32	10	32	0	32	32	32	109
Stranraer, The Rhins & West Wigton	93	56	3	55	3	52	48	48	140
Galloway & Kirkcudbright lowlands	60	31	8	29	0	29	27	27	76
Dumfriesshire & Nithsdale	52	34	2	34	0	34	34	33	95
Sub-total	**295**	**153**	**23**	**150**	**3**	**147**	**141**	**140**	**420**
Grand total	**551**	**301**	**42**	**288**	**4**	**283**	**274**	**269**	**809**

Table 26. Annual breeding success and productivity in Scottish Tawny Owls, 2003–2011.

Year	Pairs monitored	Pairs fledging young (%)	Minimum number of young fledged	Mean brood size per pair monitored
2003	70	60 (86%)	131	1.9
2004	67	57 (85%)	108	1.6
2005	92	63 (68%)	103	1.1
2006	123	88 (72%)	173	1.4
2007	101	78 (77%)	142	1.4
2008	77	62 (81%)	111	1.4
2009	91	64 (70%)	93	1.0
2010	86	66 (77%)	122	1.4
2011	130	104 (80%)	193	1.5

Table 27. Breeding success of Tawny Owls in Scotland in 2011.

Region	Nest sites checked	Pairs present	Pairs monitored	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Highland							
Inverness-shire	3	2	2	2	1	1	1
Sutherland	23	15	14	14	13	12	24
Black Isle	19	2	2	2	1	1	1
Easter Ross nest box	27	19	19	19	16	14	26
sub-total	**72**	**38**	**37**	**37**	**31**	**28**	**52**
Tayside	**35**	**31**	**25**	**25**	**25**	**25**	**45**
Argyll							
Cowal FCS nest box	41	23	23	23	16	12	22
other locations	3	3	1	1	1	1	1
sub-total	**44**	**26**	**24**	**24**	**17**	**13**	**23**
South Strathclyde	**1**	**1**	**1**	**1**	**1**	**1**	**2**
Lothian & Borders	**45**	**28**	**27**	**27**	**23**	**23**	**43**
Dumfries & Galloway	**35**	**18**	**16**	**16**	**15**	**14**	**28**
Grand total	**232**	**142**	**130**	**130**	**112**	**104**	**193**

Table 28. Breeding success of Long-eared Owls in Scotland in 2011.

Region	Known territories checked for occupation	Territories with signs of occupation	Pairs laying eggs	Pairs fledging young	Minimum number of fledged young
Highland	4	4	3	3	6
Isle of Eigg	4	4	3	3	5
Northeast Scotland	4	4	1	1	3
Isle of Colonsay	3	0	0	0	0
Tayside	14	13	9	9	20
South Strathclyde	2	2	2	1	3
Lothian & Borders	14	7	7	6	7
Dumfries & Galloway	1	1	1	1	3
Grand total	46	35	26	24	47

Table 29. Breeding success of Short-eared Owls in Scotland in 2011.

Region	Sites checked	Pairs found	Additional single birds recorded	Nests monitored	Pairs fledging young	Minimum number of young fledged
Highland	4	3	1	3	1	4
Tayside	26	19	7	11	11	27
Central Scotland	14	8	2	4	2	6
Argyll	8	6	0	5	5	11
Lothian & Borders	10	5	4	3	3	7
Dumfries & Galloway	11	11	0	10	7	25
TOTAL	**73**	**52**	**14**	**36**	**29**	**80**

Table 30. Breeding success of Common Ravens in Scotland in 2011.

Region	Home ranges checked	Home ranges occupied by pairs	Pairs monitored	Failed early or non-breeding	Pairs laying eggs	Pairs hatching eggs	Pairs fledging young	Minimum number of young fledged
Orkney	**[46]**	**[46]**	**46**	**0**	**[33]**	**[33]**	**33**	**86**
Lewis & Harris	**5**	**5**	**0**	**0**	**0**	**0**	**0**	**0**
Uist	**14**	**14**	**13**	**2**	**11**	**10**	**10**	**35**
Highland								
Sutherland	9	9	8	0	8	8	7	18
Inverness, Ross & Badenoch	8	7	7	0	7	7	7	22
Eigg & Rum	10	10	7	0	7	7	7	27
Sub-total	**27**	**26**	**22**	**0**	**22**	**22**	**21**	**67**
Tayside								
Highland Perthshire	32	28	24	2	22	19	19	48
Lowland Perth & Kinross	20	18	16	4	12	11	11	32
Angus	19	17	16	2	14	11	10	28
Fife	11	9	9	1	8	7	7	23
Sub-total	**82**	**72**	**65**	**9**	**56**	**48**	**47**	**131**
Central Scotland	**41**	**34**	**31**	**4**	**27**	**21**	**20**	**41**
Argyll								
Tiree, Islay & Mull	15	15	8	0	8	7	7	18
Colonsay	20	13	13	0	13	13	13	41
Bute	25	12	8	2	6	6	6	11
Kintyre	5	5	4	0	4	3	3	10
Sub-total	**65**	**45**	**33**	**2**	**31**	**29**	**29**	**80**
South Strathclyde								
Lowland	20	17	14	1	13	13	13	25
Upland	20	17	14	1	13	11	11	30
Coastal	11	8	8	0	8	8	8	22
Sub-total	**51**	**42**	**36**	**2**	**34**	**32**	**32**	**77**
Lothian & Borders								
Lothian	9	5	5	1	4	4	4	10
Borders, coast	13	13	13	0	13	13	13	46
Borders, upland	20	17	11	0	11	10	10	34
Sub-total	**42**	**35**	**29**	**1**	**28**	**27**	**27**	**90**
Dumfries & Galloway	**92**	**74**	**46**	**0**	**46**	**46**	**45**	**118**
Grand total	**465**	**393**	**321**	**20**	**288**	**268**	**264**	**725**

Figures in square brackets were not supplied, the one given is a minimum figure.

Annex 1: Raptor, owl and Common Raven nest site and home ranges data submitted under the Scottish Raptor Monitoring Scheme in 2011

Species	Argyll	Central Scotland	Dumfries & Galloway	Highland	Lewis & Harris	Lothian & Borders	Northeast Scotland	Orkney	South Strathclyde	Tayside & Fife	Uist	TOTAL
European Honey-buzzard			3	1								**4**
Red Kite		56	62	84			21			56		**279**
White-tailed Eagle[1]	22			20	15							**57**
Eurasian Marsh Harrier										5		**5**
Hen Harrier	77	12	11	56		5	24	135	73	87	10	**490**
Northern Goshawk		4	20	4		55	57		2	16		**158**
Eurasian Sparrowhawk	10	8		5		49		18	30	8		**128**
Common Buzzard[2]	166	244	39	130	9	54	180	10	10	136	11	**989**
Golden Eagle	64	5	2	174	32	3	19			32	14	**345**
Osprey	25	32	11	86		10	26		5	65		**260**
Common Kestrel	14	36	16	16		19		17	45	49		**212**
Merlin	4	12	13	57	3	55	102	31	12	68	4	**361**
Eurasian Hobby				1								**1**
Peregrine Falcon	30	37	112	30	3	150	33	13	57	119	6	**590**
Barn Owl	78	31	295	9		56	27		52	3		**551**
Tawny Owl	44		35	72		45			1	35		**232**
Long-eared Owl	3		1	8		14	4		2	14		**46**
Short-eared Owl	8	14	11	4		10				26		**73**
Common Raven	65	41	92	27	5	42		46	51	82	14	**465**
TOTAL	**610**	**532**	**723**	**784**	**67**	**567**	**493**	**270**	**340**	**801**	**59**	**5246**

Annex 1 shows the total number of all breeding sites and home ranges (by area) checked in 2011 and reported under the SRMS. This includes traditional nesting sites and home ranges which were found occupied but received no follow-up during the visit, and also sites and home visits, so their breeding success is unknown.

[1] White-tailed Eagle totals for Lewis & Harris and Uist RSG study areas are included under Lewis & Harris.

[2] Common Buzzard totals for a study area covering parts of both Central and Tayside regions are included under Central Scotland.

Annex 2: Raptor, owl and Common Raven breeding attempts monitored under the Scottish Raptor Monitoring Scheme in 2011

Species	Argyll	Central Scotland	Dumfries & Galloway	Highland	Lewis & Harris	Lothian & Borders	Northeast Scotland	Orkney	South Strathclyde	Tayside & Fife	Uist	TOTAL
European Honey-buzzard			3	1								**4**
Red Kite		23	60	56			15			37		**191**
White-tailed Eagle[1]	22			19	15							**56**
Eurasian Marsh Harrier										5		**5**
Hen Harrier	27	3	9	35		3	2	114	14	29	10	**246**
Northern Goshawk		1	18	2		34	47		2	6		**110**
Eurasian Sparrowhawk	6	8		5		38		8	16	8		**89**
Common Buzzard[2]	46	156	34	91	5	45	63	6	8	74	11	**539**
Golden Eagle	51	5	2	117	31		12			18	11	**247**
Osprey	15	23	7	69		9	23		4	51		**201**
Common Kestrel	2	12	4	11		12		11	23	20		**95**
Merlin	1		9	21	2	17	35	8	11	29	3	**136**
Eurasian Hobby				1								**1**
Peregrine Falcon	19	23	58	12	1	64	18	6	32	52	5	**290**
Barn Owl	44	25	150	6		21	10		30	2		**288**
Tawny Owl	24		16	37		27			1	25		**130**
Long-eared Owl			1	6		7	1		2	9		**26**
Short-eared Owl	5	4	10	3		3				11		**36**
Common Raven	33	31	46	22		29		46	36	65	13	**321**
TOTAL	**295**	**314**	**427**	**514**	**54**	**309**	**226**	**199**	**179**	**441**	**53**	**3011**

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 2011 i.e. they were effectively monitored to enable breeding success and productivity to be estimated.

[1] White-tailed Eagle totals for a study area covering Lewis & Harris and Uist regions, are included under Central Scotland RSG.

[2] Common Buzzard totals for a study area covering parts of both Central and Tayside regions, are included under Central Scotland RSG.