

1996 RAPTOR ROUND UP

Produced by the
Scottish Ornithologists' Club
on behalf of all
Scottish Raptor Study Groups
with grant aid from
Scottish Natural Heritage



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Introduction

Welcome to the second issue of the new format Raptor Round Up. This is produced by the Scottish Ornithologists' Club on behalf of the Scottish Raptor Study Groups with grant aid from Scottish Natural Heritage.

Raptors enjoy an increasingly prominent place in the politics of the Scottish countryside. The high productivity of the still tiny Red Kite population and the (now) healthy Hen Harrier population at Langholm show just how much potential Scottish environments still have for robust raptor populations. Against this potential must be set the continuing criminal interference that many raptor species still endure with a Hen Harrier situation that must be counted a national disgrace. Scottish Raptor Study Groups are privileged to be in a unique position amongst such bodies by being represented on the government's working group on birds of prey where Patrick Stirling-Aird gives eloquent voice to the Groups' views and concerns. It is yet to be seen how the recent change of government will affect these matters.

In 1996, as ever, seasonal weather patterns imposed their local and regional effects on overall raptor breeding performance and must sometimes mask long term trends. Peregrines continue to maintain a healthy and expanding population overall with poorer performance in the north and west; Sea Eagles are slowly building up their breeding population but probably depend on continued introductions for long term viability; Red Kites show every sign that they should be a common bird throughout most of the country if given the chance; Buzzards continue their welcome return to the eastern lowlands; Ospreys continue their slow but steady expansion despite a renewed increase in egg collecting. Other birds, such as the Hen Harrier, have bleak immediate prospects although we now know how quickly they might recover if given the chance; and it is easy to be complacent about our "stable" Golden Eagle population and forget the gaping holes in parts of its breeding range which cannot always be explained by the state of the habitat.

The Scottish Raptor Groups continue to play an important part in measuring the state of these birds. This report describes some of this work.

Keith Morton

This report was written by Sylvia Laing and Keith Morton and edited by Keith Morton and Stan da Prato. The Scottish Raptor Study Group logo was designed and drawn by Keith Brockie.

Osprey

Known prs	Prs eggs	Prs hatched	Broods successful	Young fledged	Production young/prs
104	93	76	74	155	1.49

One hundred and four nest were known to be occupied by pairs in 1996, which is 5 more than in 1995. Two other traditional eyries had single birds present for at least short periods and several other sites were visited for single days. Five further pairs were seen but their nests were not located or they did not breed; to keep records comparable over the years, these are not included in the official total. It is now getting difficult to locate every pair each spring.

Eggs were late in 93 nests which is only one more than last year. There were further problems with egg stealing; 4, possibly 5, clutches were illegally taken by egg thieves, including a clutch of 4 eggs. In this context, it was disappointing that the Scandinavian ringed female, which was robbed last year, did not return to breed. Thirteen nests failed with eggs, including a pair in Tayside which were shot out. Several nest failures were due to very strong winds in May.

Two pairs failed with chicks but 74 pairs, one more than last year, reared a total of 155 young, and a further 8 young were translocated from northern Scotland to England. The overall production of young from the known Scottish population was 1.49 young per nest occupied by a pair and 1.66 young per pair laying eggs, which is better than 1995. The mean brood size of successful nests was 2.09.

Tayside In Tayside, from 33 sites checked, 28 pairs laid eggs and 24 were known to hatch and fledge a minimum of 49 young, 41 of which were ringed.

Two fewer sites were occupied than 1995 but it was a more successful year overall. Only one pair was known to definitely have been robbed. A second pair may have been robbed or may have failed naturally - they relaid and reared one chick. One nest was blown out and a second pylon nesting site was discovered. A 1993 Perthshire bred chick was found dead with shotgun pellets near New Lanark. The male at Loch of the Lowes was a 1991 Loch Garten chick. Other evidence of movement of individuals between the various Scottish populations included a 1990 Aberdeenshire bred female nesting near Crieff and a female bred in 1993 in north Perthshire nesting in Ross-shire.



Osprey

Derek Robertson

White-tailed Eagle

There were 12 pairs or trios holding territory in 1996 (10 in 1995). There were no other adult birds occupying any of the known areas, and the number of breeding birds (or birds capable of breeding) on territory remained the same as 1995 at 26.

The birds in the new territory found last year successfully produced a chick this year. The Scottish bred pair bred again and were finally successful. This raises the number of known successful pairs of Sea Eagle in Scotland from 6 last year to 8 in 1996.

A record 12 clutches were known to have been laid, compared with 9 in 1995 and a record 8 clutches hatched. Seven broods survived to fledging, which was also the highest to date, and 9 young fledged, again the best year yet. Overall, therefore, 1996 was an excellent year.

Seven year summary

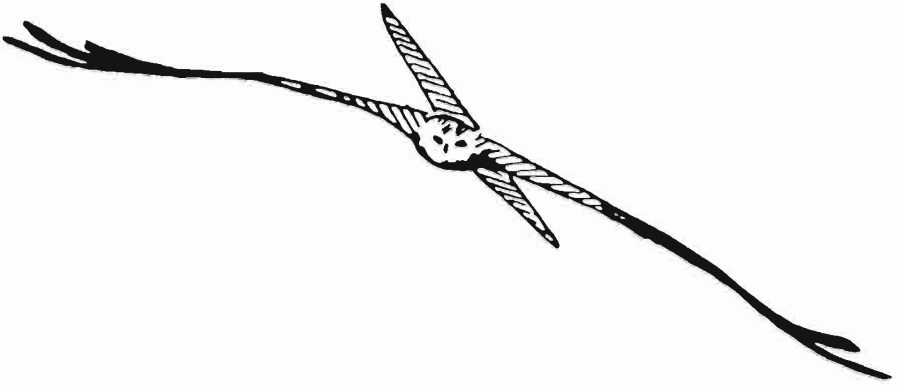
	1990	1991	1992	1993	1994	1995	1996
No of pairs or trios	9	9	8	8	10	10	12
No of unpaired birds on territory	3	1	2	4	1	4	0
No of birds on territory	21	20	19	21	22	26	26
No of areas occupied	12	10	10	10	11	14	14
No of clutches laid	9	8	9	6	8	9	12
No of clutches hatched	2	4	4	4	4	6	8
No of broods fledged	2	4	4	4	4	5	7
No of young fledged	2	7	7	5	5	7	9
Cumulative no of territories producing young	4	4	5	5	5	6	8

A further 10 birds were brought in from Norway as part of the ongoing release programme. All were successfully released.



White-tailed Eagles talon grappling

John Love

*Red Kite**Andrew Stevenson*

Red Kites

Seventeen breeding pairs produced a total of 39 young during the 1996 breeding season, the most successful so far. Moreover, it was remarkable for other reasons:

- 1 All the 15 pairs (30 adults) which bred in 1995 survived to breed again in 1996. All individuals, with the exception of one pair, remained faithful to each other.
- 2 There were 11 successful nests in 1995 and 8 of these nests were reused in 1996. However, none of the 4 nests which failed in 1995 were reused in 1996. This

trait has important conservation implications for the growing population. It suggests that in successive years successful breeding pairs are both nest and mate faithful, whilst unsuccessful pairs move to new sites and may change mates.

Clutch and brood size

Clutch size was established for 12 nests. When the broods were about 4 weeks old, all known nest trees were climbed and the young weighed, ringed and wing tagged. In addition a 'blood' feather in pin was removed from the under wing coverts of each chick for DNA sexing at Nottingham University.

Red Kite breeding success in 1996

Number of occupied territories	22
Numbers of pairs which laid eggs	17
Mean clutch size (from 12 nests)	3.25
Numbers of nests which fledged young	16
Mean number of young per successful pair	2.44
Mean number of young per pair which laid eggs	2.29
% of pairs which fledged young	94%

Hen Harrier

	Territories occupied	Territories known to have fledged young	Minimum no of young fledged	Number of young per successful territory
Perthshire	32		45	
Angus	1			
Argyll & Bute	34	24	83	3.45
North East	15	5+	12+	
Lothian & Borders (E Sutherland/E Ross)	1	1	4	
<i>Predominantly un-keepered (Strathspey/Moray)</i>	9	7	25	3.6
<i>Predominantly grouse moor</i>	10	6	15	2.5
Dumfries & Galloway	22	11	36	
South Strathclyde	37	15	55+	1.48

Perthshire Although some persecution took place the main failure was due to poor weather in May. Forty five young is only 50% of the production of the early 90's. The brood size appeared quite high, but the failure rate was recorded as very high. In Angus, a single pair failed at the egg stage.

Argyll and Bute A total of 34 nests were monitored in Argyll & Bute. Of these nests 24 (71%) were successful and fledged a total of 83 young. Overall productivity was 2.44 young per laying pair, which was slightly above the long term mean. The Argyll and Bute summary includes information from the RSPB Loch Gruinart reserve which held 9 females on territory. Seven nests were located and fledged a total of 18 young. One site in Mid Argyll failed at the large chick stage and persecution is strongly suspected. On Islay, uncontrolled muir burn affected a number of nesting localities.

North East Birds numbers and productivity in Deeside and Donside were very low with only 3 pairs on site in lower Deeside, 2 of which fledged an unknown number of young. The number of young fledged is unknown from the 3, possibly 4 pairs known or suspected in mid Deeside. No young fledged from the 4 pairs found in Donside. In Moray, 4 out of 5 pairs laid eggs and 12 young fledged from 3 nests, all these nests being on grouse moor. No birds were reported in the Cabrach area. Overall this shows a downward trend since 1989 with persecution suspected as the main cause.

Lothian & Borders One pair fledged a minimum of 4 young in the Moorfoots. The outcome from one or 2 other pairs in the Moorfoots and one pair in the Lammermuirs is unknown.

Highland Breeding success in 1996 followed a very similar pattern to previous



Hen Harrier hunting

Mike Ashley

years with productivity and nesting success highest on the northern, unmanaged moors of Sutherland and Easter Ross, and lowest on the managed grouse moors in the south and east (see table). The combined total of 19 nests produced 13 broods and 40 fledged young (mean 3.1 young/successful nest and 2.1 young/nest found).

Dumfries & Galloway Again there was no proved breeding in the Stewartry area although birds were seen in late April which perhaps still had time to breed in what was a very late season for this species. Good breeding success was enjoyed by those pairs which were allowed to, but there has been a worrying increase in human interference in some areas with - as is typically the case - insufficient evidence for any prosecutions to be brought.

South Strathclyde Thirty seven occupied territories were located in the 4 main breeding areas of North Ayrshire & Renfrewshire, east Ayrshire, south Lanark and south Ayrshire. Laying commenced at the normal time, earliest first egg 23 April, latest 13 June, with the bulk of clutches being started in the first fortnight in May. Eleven full first clutches were recorded averaging 5.1 eggs, with only one clutch of 6, slightly down on last year

with 2 x 6's and one 7. From 9 nests 93% of eggs hatched. If not interfered with, survival rate of broods were high; 90% of young hatched fledged successfully, there being only one natural failure due to Fox predation. Once again this year the main cause of failure was human interference, which was known or strongly suspected in 18 failed attempts. In addition, 2 nests suffered brood reductions, with chicks being *removed* prior to fledging. At a further 2 sites the females were shot and the males left to rear the young - in both instances successfully. This may have affected the long term survival prospects of these fledglings.

Recorded prey items were mostly Meadow Pipts and Skylarks, with grouse starting to feature later in the breeding cycle. At one nest in south Ayrshire the 20+ day old chicks were fed the haunch of a three quarter grown Rabbit. Vole numbers were high in parts of east Ayrshire and would have been important in early spring.

Only 2 tagged birds bred in the area this year - both females - one a 1992 bird from Wigtownshire, another a 1993 bird tagged in the southwest and found breeding in south Lanarkshire. The one ringing return was from a female found dead at a nest in Upper Nithsdale. She had been one of a brood of 4 ringed in 1994 in south Ayrshire.



Goshawk

Ayrshire Bird Report 1991

Goshawk

	Territories checked	Territories occupied	Territories known to have fledged young	Minimum no of young fledged	Number of young per successful territory
Tayside			1	4	4
Lothian & Borders	18	10	11	22	2

Lothian & Borders Although Goshawk numbers are slowly increasing, sites have still to be found in Lothian. Of the nests found at the egg stage, 22 young were produced from 24 eggs. Another 4 nests

found after hatching produced 13 young. Eight sites failed due to persecution, probable persecution, disturbance and natural failures. No failures were reported from nest robberies.

Buzzard

	Territories checked	Territories occupied	Territories known to have fledged young	Minimum no of young fledged	Number of young per successful territory
Argyll	99			75+	
Lothian & Borders	52	52	38	102	2.68
Highland	83	81	67	135	1.6

Argyll The RSPB reserve at Loch Gruinart had 3 pairs hunting over it, all of which nested successfully and reared a total of 5 young. On Coll, 13 nesting pairs were located and many fledged young were seen but individual nesting success and productivity was not collected in 1996. The Rabbit population on the island is still at a very high level. On Colonsay & Oronsay at least 21 pairs were present and at least 13 nests produced young. At 8 nests where the nest contents were visible, 15 young were reared. On the Cowal 21 pairs reared 21 chicks in the Loch Eck - Glen Branter study area. Elsewhere in the Cowal, 36 sites were located and, of these, 26 successful sites fledged at least one chick. In mid Argyll 5 successful pairs were monitored and reared 8 chicks.

Lothian & Borders Of the 52 sites occupied only 12 were not confirmed as breeding (but most probably were). Of the 40 sites where eggs were laid, only 2 failed, one due to the loss of large young (possible robbery) and the other failed to hatch possibly due to bad weather (this was a ground nesting site).

Highland For the second year running a brood of 5 was raised in Easter Ross. Overall, however, it was another merely average breeding season. In the main Easter Ross study area, 54 pairs were carefully followed. Two pairs did not lay, 13 failed at the egg/small chick stage and one failed with medium chicks when the nest was blown out in a gale. Average brood size from successful birds was 2.1, but, due to the 30% of pairs that failed, only 1.6 young were fledged per territorial pair. This study area, like many other low lying parts of the eastern Highlands, has seen an increase in the number of breeding pairs (up from 40 pairs in 1994). This is partly due to colonisation of new areas (probably linked to a decrease in persecution) and also to in-filling in areas with dense Rabbit populations. In one of these areas (Nigg Ferry) 11 pairs now nest in an area 4x2km with nests only 550m apart on average. One nest contained a clutch of 6 eggs. This was possibly due to 2 females laying in the same nest as only 2 young were eventually reared. The high density and the large number of 'new' pairs may be partly responsible for the high failure rate of some of these birds.

Golden Eagle

	Territories checked	Territories occupied	Territories known to have fledged young	Minimum no of young fledged	Number of young per successful territory
Central Scotland	10	9	3	3	1
Tayside W of A9	15	15	5	6+	1.2+
Tayside E of A9	12	10	4	6	1.5
Argyll	57	54	25	29	
North East	18	8	6	7	
Highland	99		36	44	1.22
Lewis & Harris	7	7	2	2	1.0
Uists	18	10	6	7	1.17

The Golden Eagles that did breed in **Tayside** in 1996 experienced a high rate of success, including one territory which was successful for the first time since the 1970's. This bird nested on an artificial platform in a 'quiet' part of its home range. Overall productivity, however, in relation to the potential number of pairs, continues to be very low, with the majority of ranges containing single immatures/juveniles, or remaining apparently 'empty' for the last 15 years. Recent information gathered by RSPB suggests a higher level of egg collecting has been taking place than previously realised. West of the A9, it was a very poor year.

Improved coverage in **North Argyll** meant that 57 home ranges were checked. Birds were present in all but 3 and at least 37 clutches were laid. Twenty five successful nests fledged 29 young including a brood of 2 from a tree site (rare in Argyll). These figures indicate an improved breeding season. However, results could have been better had human

interference at sites on Mull not resulted in failure at the egg stage of 3 nests. These matters were the subject of a successful prosecution.

North East A poor season mainly due to weather in the early part of the year. Eighteen pairs were located of which 8 laid eggs, 7 hatched and a total 7 young fledged from 6 nests. An upper Deeside pair has disappeared.

A substantial number (99) of pairs of Golden Eagles were checked for breeding success throughout **Highland** Region in 1996. There was a healthy distribution of records from across the Region, although appreciably more pairs were monitored in the west and southwest than in the north and east. Information for many pairs was patchy for the middle part of the breeding season, notably for the nestling period. So, as in previous years, the results are presented to show ultimate breeding success figures only.

In general, breeding success of 0.44 chicks per pair was below the longterm average

of around 0.5 chicks per pair. Performance was especially poor in mainland areas in the western half of the region, with an exceptionally poor success rate of 0.14 chicks per pair in south Lochaber. Better breeding performance occurred in the east and in Skye, both of which are areas

where natural food supply in summer is more abundant than in the west mainland. The high success rate among the small number of pairs from the Small Isles was particularly encouraging and somewhat unexpected. Rum, in particular, had its best Golden Eagle breeding success for many years.



Peregrine

	Territories checked	Territories occupied	Territories known to have fledged young	Minimum no of young fledged	Number of young per successful territory
Central Scotland	40	30	22	43	1.95
Tayside					
Perthshire W of A9	31	25	10	20	2.0
Perthshire E of A9	17	16	14	37+	2.64+
Angus	36	31	20	47	2.35
Argyll	23	13	9	16	
Lothian & Borders	55	52	26	70	2.69
Highland	40	33	28	56	1.7
S Strathclyde					
coastal		6	5	11/12	
inland		11	6	12	
Dumfries & Galloway					
coastal		26	12	26/27	
inland		54	35	69	
Uists	15	8	8	14+	0.58+
North East					
inland grouse moor	44	27	6	17	2.83
inland non-g moor	37	27	17	38	2.24
coastal	16	11	8	17+	2.13

Tayside East of the A9 quite a good season was noted. A female bird ringed at Loch Leven in 1989 as a nestling was recovered dead from natural causes at its nest site on the Lothian side of the Forth rail bridge. One eyrie contained the remains of a Gadwall and an adult Swift. Angus also had a good year with a slightly higher than usual success rate, although eggs were removed from 2 sites. An immature female laid 3 eggs at 2 different sites, both unsuccessfully. In the second case desertion occurred a few days before the eggs were due to hatch.

Argyll Of the 23 sites checked 20 were on the Cowal, 9 sites were not occupied

and an additional 3 known sites were not checked. The 8 successful sites fledged at least 14 chicks and 3 sites failed. Elsewhere in Argyll, few sites were monitored but breeding was proved on Coll, Colonsay (where 2 chicks were fed extensively on Kittiwakes), Scarba (outcome unknown) and Bute (failed). In mid Argyll 3 sites were monitored; two failed and one fledged 2 chicks. For another successive year a pair acted territorially in February-March at the RSPB Loch Gruinart reserve on Islay but no breeding attempt ensued.

Lothian & Borders Of the 52 sites occupied, 17 failed mainly due to human



Peregrine Ayrshire Bird Report 1990

interference. Of these 17 pairs, 6 failed at the egg stage, 4 pairs failed at the young stage and 7 pairs failed due to the disappearance of one or other of the adults. A further 12 pairs failed due to natural causes.

Highland A total of 40 sites were checked (4 less than in 1995). Thirty five were occupied by pairs, but eggs were laid at only 33 sites. Hatching occurred at 28 sites and at least 56 young were assumed to have fledged from 26 successful nests.

Overall, Peregrines appear to have had a good year, despite poor weather in early spring, which probably resulted in some pairs at higher altitudes failing to breed. However, out of all the areas covered, this was probably only evident in east Inverness.

Productivity (young per territorial pair) in 1996 was 1.7 compared with 1.2 in 1995 (a below average year). This figure would have very likely been higher if a nest had not been robbed in east Sutherland. In addition, it is likely that the actual numbers of young fledging from some nests was higher than the numbers recorded. On the plus side, a new pair bred successfully on the Black Isle, which constitutes the first successful breeding for many years. Two young were removed under licence for use in a reintroduction project in eastern Germany where it is hoped to establish a tree nesting population. These were excluded from productivity calculations.

South Strathclyde A productive year despite significant human interference at inland sites with a minimum of 0.82 chicks fledged per occupied territory.

Dumfries & Galloway Another very productive year with 1.19 chicks per occupied territory, the best productivity rate in south Scotland.

North East Coastal birds did well rearing 3 times as many young per occupied site as in 1995 although fewer sites were occupied. Inland birds breeding away from grouse moors had a reasonable year but pairs on grouse moors had yet another poor season with only 0.63 young fledged per occupied site (1.03 per occupied site away from grouse moors).

Merlin

	Territories checked	Territories occupied	Territories known to have fledged young	Minimum no of young fledged	Number of young per successful territory
Perthshire	46	26*	11	27	-
Angus	20	14**	9 (+1?)	27	3.0
Argyll & Bute	4	-	-	-	-
North-East	38	33	28	>93	
Lothian & Borders	53	34		6+	
Highland	30	20	16	56	3.5
S Strathclyde	19	10	8	17+	2.1
Dumfries & Galloway	14	9	8	24+	3.0

* Includes 10 tree nests

** Includes 1 tree nest

In **Perthshire** fewer young were raised, with several traditional sites not occupied. Five pairs are known to have definitely failed. The fate of another 10 pairs is unknown.

In **Angus** the situation looked good up till mid June. The loss of a clutch and a brood and the depletion of young between ringing and fledging spoilt the early high hopes. Seven broods were colour ringed to a specific year and site in Angus. One 1995 youngster was found dead in a crow trap.

Argyll & Bute Several regular sites were apparently unoccupied in 1996 and no successful sites were monitored in 1996 (Kintyre 1; Knapdale 1; Mid-Argyll 1; Bute 1). A pair were again present on the RSPB reserve at Loch Gruinart in May but not thereafter. On Colonsay there were several sightings and reports in the early spring but no nesting attempt was located. On the Cowal, a nest located at one usual site contained broken eggshells and was presumed predated.

North East In lower Deeside the population and overall breeding success has remained fairly constant over recent years. There has been no recent habitat degradation, indeed improved heather cover in upper Glen Dye has resulted in the resumption of breeding by Merlins there after an absence of several years. Most of upper Deeside has a stable population of birds but there has recently been a reduction in the number of pairs found in mid Deeside, particularly in Glen Tanar.

In Donside, Banffshire and Moray local populations were considered to be fairly constant during the 80s. Recent years have shown marked fluctuations in numbers and subsequent breeding success in these areas. In particular, 1995 was a very poor year which was largely due to the cold spring weather. Population decreases were noted in Donside around 1992 and, by 1995, the number of occupied territories there had halved. This decline was somewhat reversed in 1996 and could

have been a temporary set back rather than the onset of a long term decline. Detection and understanding of such fluctuations is one of the most important benefits of long term raptor monitoring.

Lothian & Borders Some areas had only partial coverage in 1996 therefore too much cannot read from the above totals. Of the 34 occupied sites, 16 are known to have laid eggs and 12 of these are known to have contained young. However, the total minimum no of young fledged at 6+ is partly due to the fact that most sites cannot be checked for fledging due to a variety of circumstances. Experience over the years would suggest that most of the nests containing young of a ringable size do in fact fledge some or all of the chicks. The above summary is for the whole of the area roughly defined as SE Scotland. Coverage was complete in the Lammermuirs, good in the Moorfoots, patchy south of the Tweed and poor in the Pentlands.

Highland Merlins in the Highlands had a better than average breeding season despite a mixed bag of weather across the different areas. In Moray, Nairn and Strathspey the weather was mainly dry and cold during the laying and incubation period and dry and sunny with very little rainfall during the fledging period. The weather during these crucial periods appeared to favour successful breeding and productivity was the highest recorded in these areas over a 9 year period. Once again Strathspey and Badenoch birds did significantly better than those from other study areas, perhaps reflecting habitat quality.

Fifty four percent of sites in Moray and Nairn were unoccupied during 1996. The

reason for this low occupancy appears difficult to understand as no significant habitat changes or drop in prey numbers were noted. Further north in Sutherland, the weather was cool and wet during the laying and incubation period and only improved significantly during the fledging period in July. Site occupancy in this area was relatively high at 72% but breeding success was well below other areas, perhaps reflecting the effects of the poor weather. Fifteen pairs found on eggs over the total area covered by the group gave an average clutch size of 4.4. Breeding success, measured by number of young per pair laying eggs, was 2.9. These figures were the highest recorded over the 9 year study period.

No unhatched eggs were found in any of the successful nests in Moray, Nairn and Strathspey, as has been the case in previous years. Hopefully, the lack of unhatched eggs may be related to the drop in levels of harmful chemicals that have been recorded in eggs taken for analysis in recent years.

South Strathclyde At least 17 chicks fledged from 8 successful nests in 16 occupied territories. Six nests were not located and, at 7 of the known nests, the final outcome was not recorded. It is therefore likely that the figure of 1.1 chicks per occupied territory was somewhat higher in reality. One nest failed naturally.

Dumfries & Galloway A minimum of 1.8 chicks fledged per occupied territory. This was the output from the 8 nests where the final outcome was discovered. Four nests were not located and at 5 others no outcome was determined.

Kestrel

	Territories checked	Territories occupied	Territories known to have fledged young	Minimum no of young fledged	Number of young per successful territory
Ayrshire study area	46	37	27		4.7
Argyll	17	17	9	34	
Highland		28	24	-	

Ayrshire study area From early February till the end of the first week in April the dry, sunny weather suited Kestrels and birds were on territory early with an occupancy rate of 80% compared to 50% in 1995.

Laying was predominantly in April with only 2 of 18 known dates of 1st eggs being in May. Two hens laid on 1 April, the earliest known laying date recorded. Clutch sizes were very high with one of 7 and 10 of 6 eggs being recorded.

Twelve adults were trapped and the 10 hens' weights averaged 281g, well up on 1995 and slightly up on 1994. Only one retrap was recorded, a hen in the same territory for the third season in succession. All 6 recorded failures occurred at the clutch stage; 2 nests became waterlogged during a spell of driven rain (one site only 8 feet off the ground); 2 nests had eggs taken with human signs evident; one nest failed when the male was killed and plucked by a Goshawk (the hen then disappeared); one failure was undetermined.

Productivity was extremely high with 4.7 young being raised per successful nest and 3.5 for all breeding attempts. Fifty eight young were ringed. Only 2 ringing recoveries were received, one bird being

found dead only 1 k from its natal site the following March and one ringed in the Carrick Forest in June 1995 recovered dead at New Cumnock in February 1996.

Argyll Two successful pairs were monitored in mid Argyll and reared a total of 7 young. In the Cowal. 15 occupied sites were located; 7 sites were followed up and these fledged a total of 27 young.



Kestrels

Frances Godfrey

Highland Twenty eight sites had pairs present this year, one pair down on last year's total. Mean clutch size at 5.1 was 0.3 lower than last year, as was mean brood size, which was slightly lower at 4.6 compared with last year's 4.7. Overall productivity was down from 4.2 chicks per

pair to 3.9 chicks per pair. Failures were predictably at the egg and early chick stage.

Most records came from Sutherland and East Ross and 71% of records were from nest boxes.



Raven

	Territories checked	Territories occupied	Territories known to have fledged young	Minimum no of young fledged	Number of young per successful territory
Central Scotland	46	35	19	26	-
Tayside	56	39	21	43+	2.0+
Argyll	10				

Central Scotland Minimum number of fledged young is unknown but 10 successful pairs reared 26 young. The outcome of the other 9 successful pairs is unknown.

Tayside Twenty one pairs are thought to have fledged at least 43 young. All were crag or cliff sites, apart from one on a hydro-electric dam. In Angus, 3 pairs successfully reared an unknown number of young.

Argyll All 10 nests located were on Bute and 2 of these failed, the outcome of the others is uncertain.

North East Many sightings of pairs and groups of up to 21 birds but still no evidence of birds breeding the the area.

Lothian & Borders The only information received concerns a few, new nests sites reported in the southwest of the region. The species is reported as increasing.

The influence of habitat on the reproductive output of Buzzards in the Highlands of Scotland

Dominic Sargent

Highland Raptor Study Group data on the proportion of different habitat types present within a 1km radius of a sample of Highland Buzzard nests, the altitudes of those nests and the number of young fledged from them were analysed in order to investigate possible interactions between the different variables.

The data covered the 1990-93 (inclusive) breeding seasons and provided details on various aspects of nest site location; breeding success/failure; food items; and habitat types within 1km radius of the nest. The 1km distance was considered suitable for present purposes as Buzzards *Buteo buteo* have been observed to generally remain within 1km of their nests (Newton, Davis and Davis 1982 *Journal of Applied Ecology* 18:681-706). There were 6 broad habitat categories: farmland; grassland; heather; coniferous forest; broadleaves; and deer forest. Failed nests were excluded from the study as they were thought not to be a true representation of the total number of failures.

The study area, which was contained within Highland Region, was divided into east and west Highlands. The west Highlands comprised of Lochaber, west Inverness, Skye and Lochalsh, west Sutherland and north west Sutherland. East Sutherland, south central Sutherland, east Ross-shire, Moray and east Inverness constituted the east Highlands.

Altitude had no effect on reproductive output, measured as the number of young

fledged per successful pair, for either west or east coast Buzzards (Spearman, $r=0.157$ west; $r=0.177$ east, $p>0.05$ in both cases). The average number of young fledged per successful pair was significantly higher in east coast Buzzards ($x=2.2$) as compared with west coast Buzzards ($x=1.8$) (Mann-Whitney $W=1359.5$, $n=79$, $p<0.05$), a result consistent with the findings of Swann and Etheridge (1995 *Bird Study* 42: 37-43) and probably related to food supplies.

Spearman correlations were carried out to test for relationships between the number of young fledged per successful pair and the proportion of different habitat types within 1km of each corresponding nest site. For both the west and east Highlands there was no significant correlation between the number of young fledged per successful pair and the proportion of any one habitat type within 1km of the nest site.

Combinations of 2 habitat types also did not result in any positive correlations between reproductive output and habitats.

Ratios of the extent of each habitat type between east and west coasts revealed

that the east coast had nearly 6 times as much farmland, and over 2.5 times as much farmland + grassland as the west. The west had 50 times as much deer forest as the east coast. To test for

Birds 69:199-210; Austin 1992 unpublished PhD thesis, University of Glasgow). In so far as the east coast had much farmland and grassland (53.2% of total habitat area) and the highest

Tables 1 and 2: Results of Spearman correlations for numbers of young fledged per successful pair and the percentage of a given habitat type within 1km of the nest site.

Table 1 West coast: $n = 32$, $p > 0.05$ in all cases.

Habitat	'r' value
grassland	+0.067
farmland	-0.133
woodland	-0.067
grassland & farmland	+0.013
grassland & deer forest	+0.065
deer forest & plantation	-0.051
broadleaves & heather	+0.005

Table 2 East coast: $n = 28$, $p > 0.05$ in all cases.

Habitat	'r' value
grassland	-0.165
farmland	+0.051
woodland	-0.143
grassland & farmland	-0.053
broadleaves & heather	-0.025

interactions in habitats and fledging success between the east and west, a 2 way ANOVA was used. The ANOVA revealed that there was no interaction between the numbers of young fledged (east and west) and the proportion of grassland and farmland within 1km of the nest ($F=0.46$ $df=3$ $p=0.710$). A similar situation pertained for deer forest and heather ($f=0.26$ $df=3$ 0.857). A principal component analysis of the data also showed no significant relationship between the proportion of different habitat types within 1km of a nest site and the number of young fledged from that nest.

Farmland and upland, perennial grassland have been shown to be particularly productive (Picozzi and Weir 1974 *British*

reproductive output, and the west had considerable amounts of deer forest and plantation (62.4% of total habitat area) and the lowest reproductive success, it might be proposed that, at the 'regional' level, the predominant habitats of an area were a factor influencing reproductive output.

It might reasonably be assumed that, in the Highlands, as in other areas, food supply is a major determinant of reproductive success (for example: Dare 1961 Unpublished PhD thesis, Exeter University; Holdsworth 1971 *British Birds* 64: 412-420; Tubbs and Tubbs 1985 *Biological Conservation* 31: 41-65). This being the case, it would appear from this study that food supply does not correlate

with the habitat characteristics within 1km of the nest site. This situation may be explained by the lack of data concerning true territory size and quality and the time spent by Buzzards in using a given habitat type. Considerable variation in Buzzard territory size is recorded (see Dare 1961 unpublished PhD thesis, Exeter University; Halley 1993 *Bird Study* 40: 24-30; Sargent 1995 unpublished BSc. dissertation, University of St Andrews). Furthermore, the sampling assumes that a nest is located in the centre of a 'territory' and that the 'territory' is of regular shape (ie a circle). In reality, this is most unlikely Brown (1976 *British Birds of Prey* Collins, London) suggest that Buzzards devote

particular attention to favourable areas, but does not indicate what the vegetational characteristics of such areas are.

Despite the limitations of the data, this study suggests that, within the area 1km from a nest, there is, in spatial terms, no habitat type that exerts a measurable influence over the productivity (measured as the number of young fledged per successful pair) of a Buzzard pair; and it has also emphasised the ability of the Buzzard to successfully utilise different habitat types.

I wish to thank the Highland Raptor Study Group for allowing me access to their Buzzard breeding data.

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Buzzard

Bobby Smith

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Highland - Roy Dennis, Colin Croke, Brian Etheridge, Jeff Watson, Bob Swann and Jim Craib

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Immature Golden Eagle

Steven Brown

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