

Kestrel



Figure 1: Juvenile Kestrel in Fife in 2017 (Photo: Robin Manson, Tayside & Fife RSG).

The Scottish Kestrel population is poorly represented by existing SRMS data, though these include data from some high quality local studies.

Our latest analysis of SRMS data for the period 2009-2018 produced no national trends in breeding number or productivity of Kestrel, however, trends are available for three of the 11 SRMS regions (Table 1) and for two of the 20 NHZ regions (Table 2) for which the SRMS holds records for Kestrel.

Users of the published trends users should be aware that few data are available for trends in breeding numbers, these coming from around 25 pairs based in two areas (Figure 7). Only ten of these pairs are on the mainland, and the increase in numbers from this area (in Lothian & Borders) is probably not representative of the wider population. Kestrel data are largely nest-box based. Annual productivity information for Kestrel is drawn from 30-80 pairs spread across much of the range, but with poor

representation over much of the Highlands, North East Scotland and also much of Lothian & Borders.

National trends

No trends in breeding numbers or breeding productivity are available for Kestrel at a national level.

BBS data for Scotland showed a significant decline in the national Kestrel population over the period 2008-2018 (Harris *et al.*, 2020).

SRMS regional trends

Breeding numbers of Kestrel showed non-linear variation in Orkney and no significant change in Lothian & Borders (Table 1, Figure 2).

Breeding success of Kestrel did not change significantly in either Orkney or South Strathclyde (Table 1, Figure 3).

No trends for Kestrel are available for clutch size, brood size or number of fledglings in any region (Table 1).

Trends for this species are not yet available for Argyll, Central, Dumfries & Galloway, Highland, Lewis & Harris, North East Scotland, Tayside & Fife or Uist.

NHZ regional trends

Breeding numbers of Kestrel decreased in NHZ 02 and did not change significantly in NHZ 20 (Table 2, Figure 4).

Breeding success of Kestrel did not change significantly in either NHZ 02 or NHZ 17 (Table 2, Figure 5).

No trends for Kestrel are available for clutch size or brood size (Table 53). Number of fledglings did not change significantly in NHZ 17 (Table 2, Figure 6).

Trends for this species are not yet available for NHZs 03-16, 18-19 and 21.

Details of contributing records

2,609 (104 to 394 per year, mean: 261 records) from 2009-2018 contributed to this trends analysis (Table 5).

References

Harris, S.J., Massimino, D., Balmer, D.E., Eaton, M.A., Noble, D.G., Pearce-Higgins, J.W., Woodcock, P. & Gillings, S. (2020) The Breeding Bird Survey 2019.

Table 1: Summary of SRMS regional trends for Kestrel during 2009-2018. Non-significant changes highlighted in grey. ‘Non-linear’ indicates non-linear trends. ‘—’ indicates where the species occurs but no trend is available. ‘No SRMS data’ indicates where the SRMS does not hold any records for the region of interest. ‘Absent’ indicates where the species is not known to breed.

SRMS Region	Pairs	Success	Clutch size	Brood size	Number of fledglings
Argyll	—	—	—	—	—
Central	—	—	—	—	—
Dumfries & Galloway	—	—	—	—	—
Highland	—	—	—	—	—
Lewis & Harris	—	—	—	—	—
Lothian & Borders	—	—	—	—	—
North East Scotland	—	—	—	—	—
Orkney	Non-linear	Not significant	—	—	—
Shetland	Absent	Absent	Absent	Absent	Absent
South Strathclyde	—	Not significant ^{ns}	—	—	—
Tayside & Fife	—	—	—	—	—
Uist	—	—	—	—	—

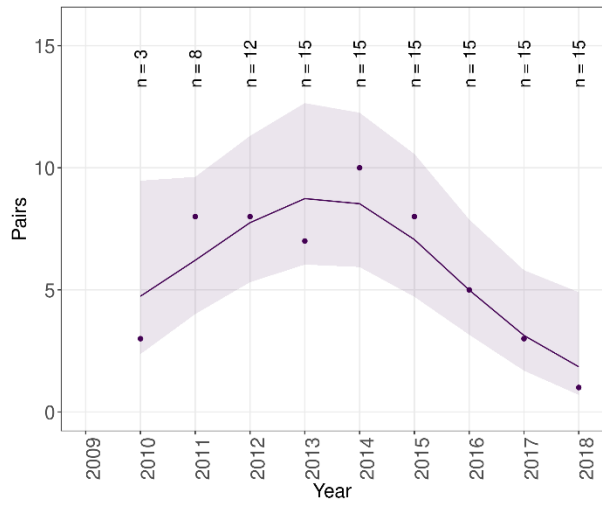
ⁿ Nestbox based, ^s Sample sizes small.

Table 2: Summary of NHZ regional trends for Kestrel during 2009-2018. Figures in parentheses indicate the annual change, with significant decreases highlighted in blue and non-significant changes highlighted in grey. ‘—’ indicates where the species occurs but no trend is available. ‘No SRMS data’ indicates where the SRMS does not hold any records for the region of interest. ‘Absent’ indicates where the species is not known to breed.

NHZ Region	Pairs	Success	Clutch size	Brood size	Number of fledglings
01. Shetland	Absent	Absent	Absent	Absent	Absent
02. North Caithness and Orkney	Decrease ^s (-14.8%)	Not significant ^s	—	—	—
03. Coll, Tiree and the Western Isles	—	—	—	—	—
04. North West Seaboard	—	—	—	—	—
05. The Peatlands of Caithness and Sutherland	—	—	—	—	—
06. Western Seaboard	—	—	—	—	—
07. Northern Highlands	—	—	—	—	—
08. Western Highlands	—	—	—	—	—
09. North East Coastal Plain	—	—	—	—	—
10. Central Highlands	—	—	—	—	—
11. Cairngorm Massif	—	—	—	—	—
12. North East Glens	—	—	—	—	—
13. East Lochaber	—	—	—	—	—
14. Argyll West and Islands	—	—	—	—	—
15. Loch Lomond, The Trossachs and Breadalbane	—	—	—	—	—
16. Eastern Lowlands	—	—	—	—	—
17. West Central Belt	—	Not significant ^s	—	—	Not significant ^{ns}
18. Wigtown Machairs and Outer Solway Coast	—	—	—	—	—
19. Western Southern Uplands and Inner Solway	—	—	—	—	—
20. Border Hills	Not significant ^s	—	—	—	—
21. Moray Firth	—	—	—	—	—

ⁿ Nestbox based, ^s Sample sizes small.

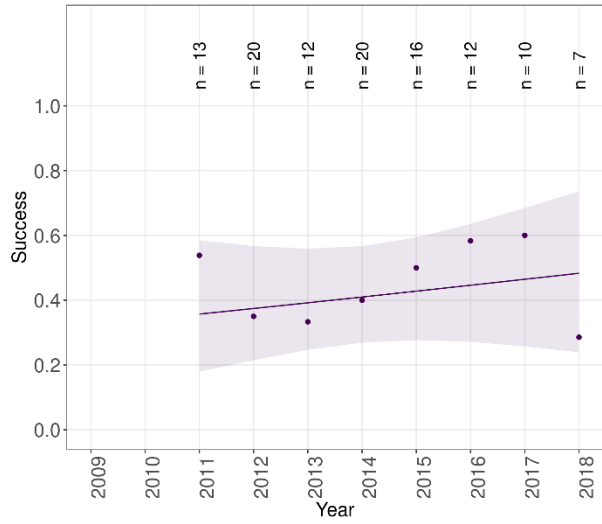
Trend in Pairs of Kestrel in Orkney using SRMS data



Orkney trend: Non-linear (caveats: Sample sizes small, Nestbox based)

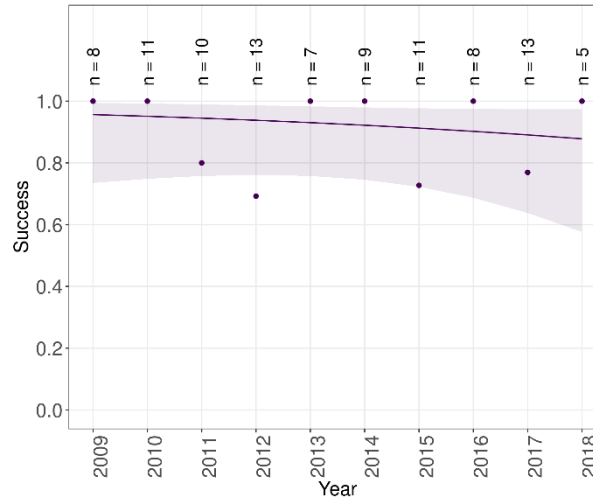
Figure 2: Trends in numbers of breeding pairs of Kestrel by SRMS region during 2009-2018.

Trend in Success of Kestrel in Orkney using SRMS data



Orkney trend: Not significant

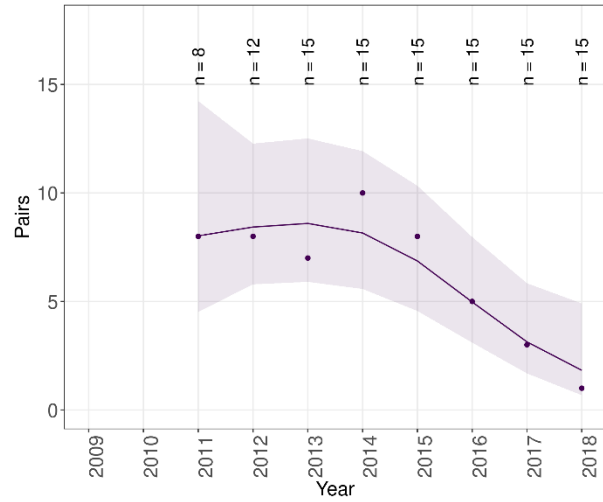
Trend in Success of Kestrel in South Strathclyde using SRMS data



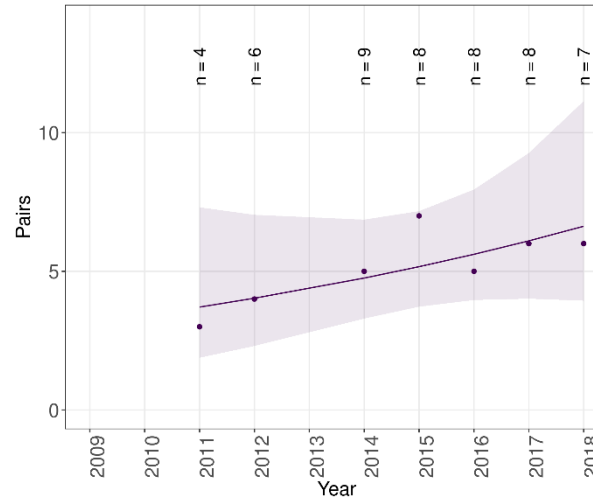
South Strathclyde trend: Not significant (caveats: Sample sizes small; Nestbox based)

Figure 3: Trends in breeding success of Kestrel by SRMS region during 2009-2018.

Trend in Pairs of Kestrel in 02. North Caithness and Orkney using SRMS data



Trend in Pairs of Kestrel in 20. Border Hills using SRMS data

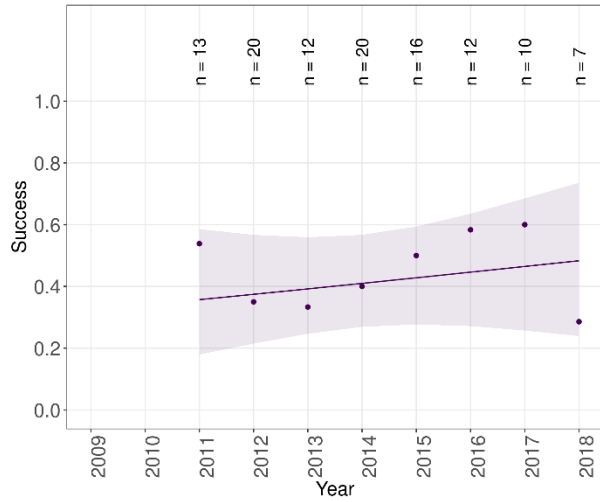


02. North Caithness and Orkney trend: Decrease (caveats: Sample sizes small)

20. Border Hills trend: Not significant (caveats: Sample sizes small)

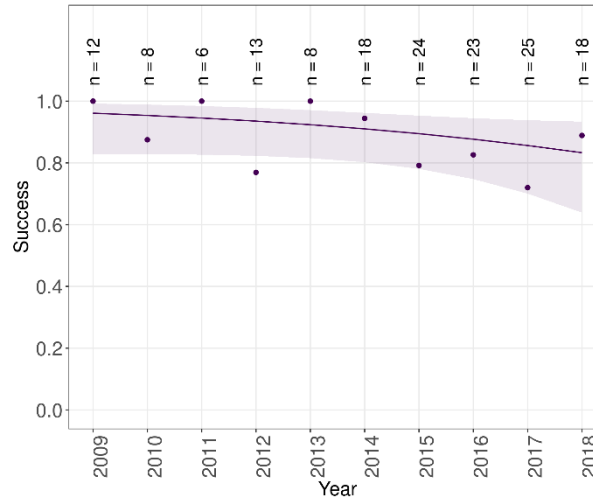
Figure 4: Trends in breeding pairs of Kestrel by NHZ region during 2009-2018.

Trend in Success of Kestrel in 02. North Caithness and Orkney using SRMS data



02. North Caithness and Orkney trend: Not significant
(caveats: Sample sizes small)

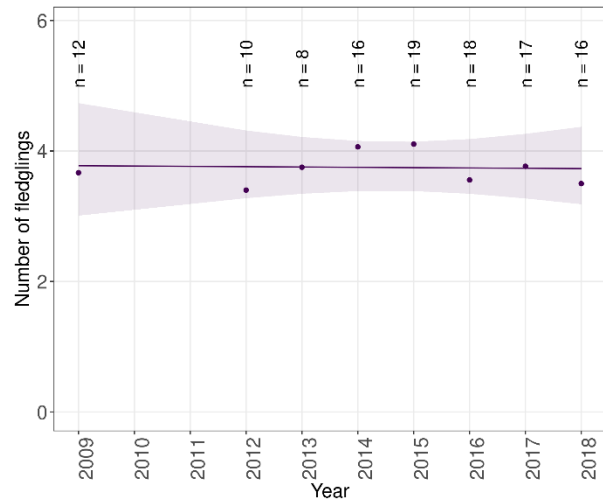
Trend in Success of Kestrel in 17. West Central Belt using SRMS data



17. West Central Belt trend: Not significant (caveats:
Sample sizes small)

Figure 5: Trends in breeding success of Kestrel by NHZ region during 2009-2018.

Trend in Number of fledglings of Kestrel in 17. West Central Belt using SRMS data



17. West Central Belt trend: Not significant (caveats: Nestbox based; Sample sizes small)

Figure 6: Trends in number of fledglings of Kestrel by NHZ region during 2009-2018.

Table 3: Details of SRMS Regional trends for Kestrel.

Parameter	Region	First year of trend	Last year of trend	Number of years	Mean number of home ranges across years	Mean parameter value (and 95% confidence limits)	Trend during the period	Caveats	Estimated % annual change (and 95% confidence limits)
Pairs	Orkney	2010	2018	9	12.6	5.9 (3.6 to 8.2)	Non-linear	Sample sizes small, Nestbox based	Non-linear
Success	Orkney	2011	2018	8	13.8	0.4 (0.4 to 0.5)	Not significant		1.7 (-3.3 to 7.0)
	South Strathclyde	2009	2018	10	9.5	0.9 (0.8 to 0.9)	Not significant	Sample sizes small; Nestbox based	-0.5 (-1.8 to 0.5)

Table 4: Details of NHZ Regional trends for Kestrel.

Parameter	Region	First year of trend	Last year of trend	Number of years	Mean number of home ranges across years	Mean parameter value (and 95% confidence limits)	Trend during the period	Caveats	Estimated % annual change (and 95% confidence limits)
Pairs	02. North Caithness and Orkney	2011	2018	8	13.75	6.2 (3.7 to 8.8)	Decrease	Sample sizes small	-14.8 (-24.9 to -3.4)
	20. Border Hills	2011	2018	7	7.1429	5.1 (3.9 to 6.4)	Not significant	Sample sizes small	8.6 (-5.8 to 25.3)
Success	02. North Caithness and Orkney	2011	2018	8	13.75	0.4 (0.4 to 0.5)	Not significant	Sample sizes small	1.7 (-3.3 to 7.0)
	17. West Central Belt	2009	2018	10	15.5	0.9 (0.8 to 0.9)	Not significant	Sample sizes small	-0.6 (-1.5 to 0.1)
Number of fledglings	17. West Central Belt	2009	2018	8	14.5	3.8 (3.5 to 4.0)	Not significant	Nestbox based; Sample sizes small	-0.1 (-3.7 to 3.6)

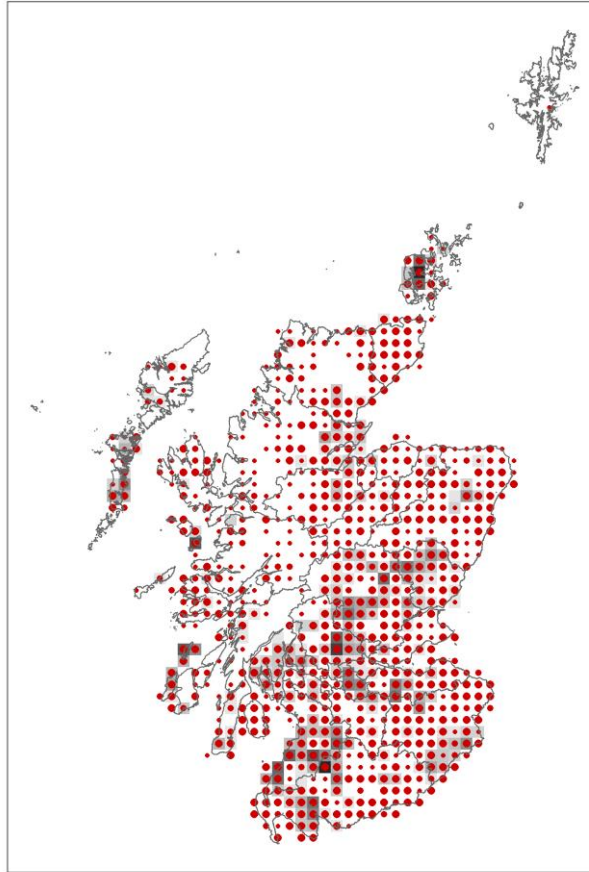
Table 5: Number of Kestrel home range checks for occupancy reported to the SRMS during 2009-2018, in each of the 12 SRMS Regions, with approximate proportion of estimated population monitored. At the bottom of the table, row A is the mean number of home range checks over the most recent five years. Row B gives the estimated proportion of the national population in each region, based on Bird Atlas Timed Tetrad Visit (TTV) data. The depth of red shading indicates the relative importance of each region for this species. If survey effort was spread evenly across the whole population, the ratio of A:B would not vary much between regions.

Year	ARGYLL	CENTRAL SCOTLAND	DUMFRIES & GALLOWAY	HIGHLAND	LEWIS & HARRIS	LOTHIAN & BORDERS	NORTH EAST SCOTLAND	ORKNEY	SHETLAND	SOUTH STRATHCLYDE	TAYSIDE & FIFE	UIST	Total
2009	30	9	16	15	0	0	0	0		25	6	3	104
2010	17	8	13	16	5	2	0	5		29	13	0	108
2011	18	7	26	16	0	19	0	15		35	57	5	198
2012	14	49	29	14	0	59	9	28		36	68	12	318
2013	13	56	28	14	0	7	9	30		37	33	13	240
2014	23	66	35	36	2	43	16	35		36	84	18	394
2015	23	47	30	26	0	32	0	46		39	97	13	353
2016	23	38	22	13	0	27	0	48		27	37	13	248
2017	31	42	25	20	2	47	0	42		34	59	15	317
2018	15	41	31	35	0	49	1	46		25	75	11	329
A: Mean home range checks	23.0	46.8	28.6	26.0	0.8	39.6	3.4	43.4	Absent	32.2	70.4	14.0	328.2
B: Proportion of estimated Scottish population	7	8	15	18	0	12	10	1	0	15	13	1	100

a)



b)



c)

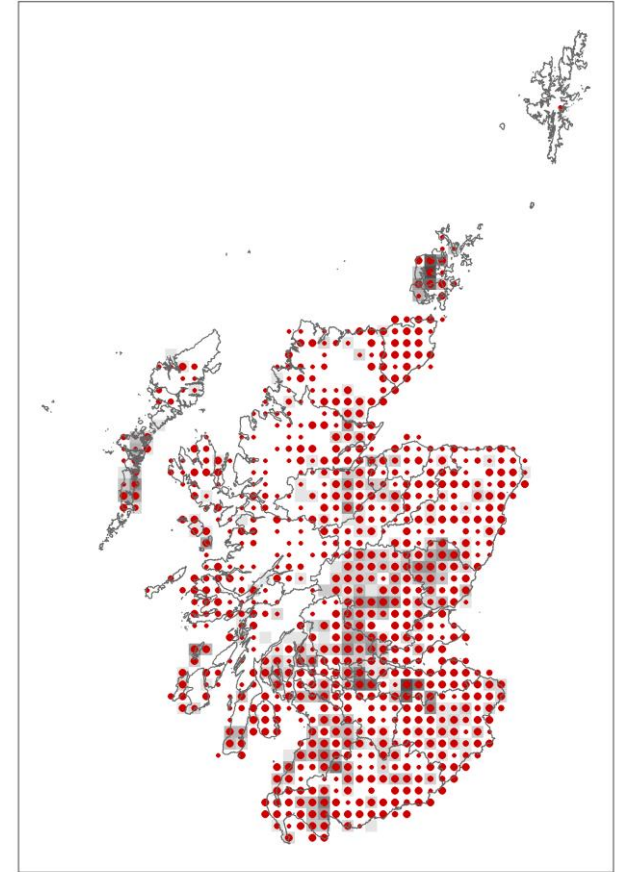


Figure 7: Areas corresponding to the clusters of home ranges from which sufficient data were reported to attempt to derive population trends for Kestrel between 2009 and 2018 (a) together with maps showing variation in the number of Kestrel records reported to SRMS during 2009-2013 (b) and 2014-2018 (c), in the context of the known Kestrel breeding distribution taken from the 2007-2011 Bird Atlas. SRMS data are depicted as grey squares with darker shading indicating more records while Bird Atlas data are depicted as red dots with the size of dot positively related to probability of breeding.