# Goshawk



Figure 1: Goshawk Highland in 2021 (Photo: Dave Pierce, Highland RSG).

Goshawk monitoring in Scotland is largely limited to three discreet study areas.

Our latest analysis of SRMS data for the period 2009-2018 showed that while no national trends in breeding number or productivity of Goshawk are available, trends are available for two of the seven (Table 1) SRMS regions and trends in productivity are available for three of the 14 NHZ regions (Table 2) for which the SRMS holds records for Goshawk.

Users of the published trends should be aware that few records were available for production of trends in breeding numbers, all coming from a single area which cannot be relied on to reflect regional or national trends (Figure 7). Records for productivity trends are mostly drawn from the south of Scotland, with no data from North East Scotland, and few records from north of Scottish Borders and Dumfries & Galloway.

#### National trends

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

#### SRMS regional trends

Breeding numbers did not change significantly in Dumfries & Galloway (Table 1, Figure 2).

Breeding success of Goshawk decreased significantly in Dumfries & Galloway (-1.4%) and did not change significantly in Lothian & Borders (Table 1, Figure 3).

No trends for Goshawk are available for clutch size or brood size (Table 1). Number of fledglings in Dumfries & Galloway and Lothian & Borders did not change significantly (Table 1, Figure 4).

Trends for this species are not yet available for Argyll, Central, Highland, North East Scotland, South Strathclyde or Tayside & Fife.

### NHZ regional trends

Breeding success of Goshawk did not change significantly in two regions (NHZs 16 and 20) and showed non-linear variation in NHZ 19 (Table 2, Figure 5).

No trends are available for Goshawk the number of breeding pairs, clutch size or brood size (Table 2). Numbers of fledglings did not change significantly in three regions (NHZs 16, 19-20) (Table 2, Figure 6).

Trends for this species are not yet available for NHZs 05, 09-15, 17 and 21.

## Details of contributing records

1,141 (86 to 139 per year, mean: 114 records) from 2009-2018 contributed to this trends analysis (Table 5).

**Table 1:** Summary of SRMS regional trends for Goshawk 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.

SRMS Region	Pairs	Success	Clutch size	Brood size	Number of fledglings
Argyll	Absent	Absent	Absent	Absent	Absent
Central	—	—	—	—	—
Dumfries & Galloway	Not significant <sup>s</sup>	Decrease (-1.4%)	—	_	Not significant
Highland		<u> </u>	—	—	_
Lewis & Harris	Absent	Absent	Absent	Absent	Absent
Lothian & Borders	—	Not significant	_	_	Not significant
North East Scotland		<u> </u>	—	—	_
Orkney	Absent	Absent	Absent	Absent	Absent
Shetland	Absent	Absent	Absent	Absent	Absent
South Strathclyde		<u> </u>	—	—	_
Tayside & Fife		—		—	_
Uist	Absent	Absent	Absent	Absent	Absent

<sup>s</sup> Sample sizes small.

**Table 2:** Summary of NHZ regional trends for Goshawk during 2009-2018. Figures in parentheses indicate the annual change, with significant increases highlighted in green, significant decreases highlighted in blue and 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.

NHZ Region	Pairs	Success	Clutch size	Brood size	Number of fledglings
01. Shetland	Absent	Absent	Absent	Absent	Absent
02. North Caithness and Orkney	Absent	Absent	Absent	Absent	Absent
03. Coll, Tiree and the Western Isles	Absent	Absent	Absent	Absent	Absent
04. North West Seaboard	Absent	Absent	Absent	Absent	Absent
05. The Peatlands of Caithness and Sutherland	—	—	—	—	
06. Western Seaboard	Absent	Absent	Absent	Absent	Absent
07. Northern Highlands	No SRMS data	No SRMS data	No SRMS data	No SRMS data	No SRMS data
08. Western Highlands	Absent	Absent	Absent	Absent	Absent
09. North East Coastal Plain	—	—	<u> </u>	—	
10. Central Highlands	—	—	—	—	
11. Cairngorm Massif		_	<u> </u>	_	
12. North East Glens	—	_	<u> </u>	—	
13. East Lochaber					<u> </u>
14. Argyll West and Islands		_		_	
15. Loch Lomond, The Trossachs and Breadalbane		_		_	
16. Eastern Lowlands		Not significant sv			Not significant <sup>rs</sup>
17. West Central Belt		_		_	
18. Wigtown Machairs and Outer Solway Coast	Absent	Absent	Absent	Absent	Absent
19. Western Southern Uplands and Inner Solway		Non-linear			Not significant <sup>rs</sup>
20. Border Hills		Not significant s	_		Not significant <sup>rs</sup>
21. Moray Firth		_	—	—	

<sup>r</sup> No home range random effect, <sup>s</sup> Sample sizes small, <sup>v</sup> Variable effort.



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



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



Figure 4: Trends in number of fledglings of Goshawk by SRMS region during 2009-2018.



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



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

**Table 3:** Details of SRMS Regional trends for Goshawk.

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	Dumfries & Galloway	2009	2018	9	5.9	5.0 (4.1 to 5.9)	Not significant	Sample sizes small	-1.3 (-10.7 to 9.1)
Success	Dumfries & Galloway	2009	2018	10	21.2	0.8 (0.7 to 0.8)	Decrease		-1.4 (-2.9 to -0.1)
	Lothian & Borders	2009	2018	10	22.2	0.9 (0.9 to 1.0)	Not significant		0.4 (-0.9 to 1.4)
Number of fledglings	Dumfries & Galloway	2009	2018	9	17.3	2.2 (2.1 to 2.3)	Not significant		-1.8 (-5.7 to 2.2)
	Lothian & Borders	2009	2018	10	20.2	2.3 (2.1 to 2.4)	Not significant		-2.2 (-5.2 to 0.9)

**Table 4:** Details of NHZ Regional trends for Goshawk.

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)		
Success	16. Eastern Lowlands	2009	2018	10	11.3	1.0 (0.9 to 1.0)	Not significant	Sample sizes small; Variable effort	4.3 (-0.4 to 7.6)		
	19. Western Southern Uplands and Inner Solway	2009	2018	10	18.1	0.7 (0.7 to 0.8)	Non-linear	Sample sizes small	Non-linear		
	20. Border Hills	2009	2018	10	17.1	0.9 (0.8 to 0.9)	Not significant	Sample sizes small	-0.6 (-1.7 to 0.3)		
Number of fledglings	16. Eastern Lowlands	2009	2018	10	10.6	2.2 (2.1 to 2.4)	Not significant	Sample sizes small; No home range random effect	-1.7 (-6.3 to 3.0)		
	19. Western Southern Uplands and Inner Solway	2009	2018	9	14.33333	2.3 (2.1 to 2.5)	Not significant	Sample sizes small; No home range random effect	-2.3 (-6.7 to 2.4)		
	20. Border Hills	2009	2018	10	14.8	2.2 (2.1 to 2.3)	Not significant	Sample sizes small; No home range random effect	-2.3 (-5.9 to 1.4)		

**Table 5:** Number of Goshawk 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		0	26	0		49	41			0	0		116
2010		0	25	2		52	0			2	5		86
2011		0	10	4		56	0			1	17		88
2012		4	35	3		47	0			2	12		103
2013		5	34	1		46	0			3	9		98
2014		4	35	5		49	0			7	9		109
2015		0	37	6		51	4			11	21		130
2016		4	35	12		50	5			18	15		139
2017		8	36	10		46	0			11	26		137
2018		7	38	12		44	1			11	22		135
A: Mean home range checks	Absent	4.6	36.2	9.0	Absent	48.0	2.0	Absent	Absent	11.6	18.6	Absent	130.0
B: Proportion of estimated Scottish population	0	0	18	24	0	21	24	0	0	9	3	0	100



**Figure 7:** Areas corresponding to the clusters of home ranges from which sufficient data were reported to attempt to derive population trends for Goshawk between 2009 and 2018 (a) together with maps showing variation in the number of Goshawk records reported to SRMS during 2009-2013 (b) and 2014-2018 (c), in the context of the known Goshawk 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.