

# Raven



**Figure 1:** Raven at nest site in Ayrshire (Photo: Angus Hogg, South Strathclyde RSG).

The Scottish Raven 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 showed that while no national trends in breeding number or productivity of Raven are available, trends are available for six of the 12 SRMS regions (Table 1) and eight of the 21 NHZ regions (Table 2) for which the SRMS holds records for Raven.

Users of the published trends users should be aware that, while trends in breeding numbers of Raven are based on a broadly representative range of locations across the southern half of Scotland, the

relevant areas have not been covered consistently over time (Figure 9). The lack of data from Highland or any of the archipelagic regions means that trends may not be representative of northern populations. Records for productivity trends are drawn from across the Raven's Scottish range, but with relatively poor representation in the north and west, with the exception of Uist. Some Raven records from Shetland that have only recently been made available to SRMS are not included in the current analysis. Consultation with data contributors has highlighted that especially for an early breeding species like Raven - where 'monitored' pairs are reported on incidentally during monitoring of other species, early failures will often be missed.

Population expansion, including in-filling, may go undetected unless monitoring is area-based, with active searching for new pairs each year (e.g. Negative trend in abundance of Raven in L&B is due mainly to a reduction in available survey effort).

#### *National trends*

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

BBS data for Scotland showed no significant change at a national level over the period 2008-2018 (Harris *et al.*, 2020), though the longer term trend shows a 60% increase over the period 1995-2020.

#### *SRMS regional trends*

Breeding numbers of Raven increased in Dumfries & Galloway, but did not change significantly in Argyll, Lothian & Borders, South Strathclyde, Tayside & Fife or Uist (Table 1, Figure 2).

Breeding success of Raven decreased in South Strathclyde and did not change significantly in Argyll, Central, Dumfries & Galloway, Highland, Lothian & Borders, Tayside & Fife or Uist (Table 1, Figure 3).

No trends for Raven are available for clutch size or brood size (Table 1). Number of fledglings in Argyll, Central, Dumfries & Galloway, Highland, Lothian & Borders, South Strathclyde, Tayside & Fife and Uist did not change significantly (Table 1, Figure 4).

Trends for this species are not yet available for Central, Highland, Lewis & Harris, North East Scotland, Orkney or Shetland.

#### *NHZ regional trends*

Breeding numbers of Raven decreased in NHZ 11, increased in NHZ 19, and did not change significantly in a further six regions (NHZs 03, 14-17 and 19-20) (Table 2, Figure 5).

Breeding success of Raven in seven regions (NHZs 03, 14-17 and 19-20) did not change significantly (Table 2, Figure 6).

No trends for Raven are available for clutch size or brood size (Table 2). Number of fledglings in seven

regions (NHZs 03, 14-17 and 19-20) did not change significantly (Table 2, Figure 7).

Trends for this species are not yet available for NHZs 01-02, 04-10, 12-13, 18 and 21.

#### *Details of contributing records*

5,109 (405 to 632 per year, mean: 511 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 Raven 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. ‘—’ 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.

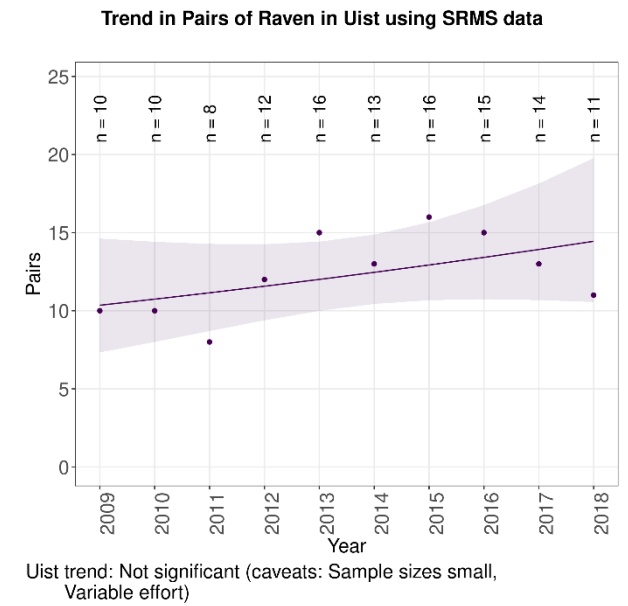
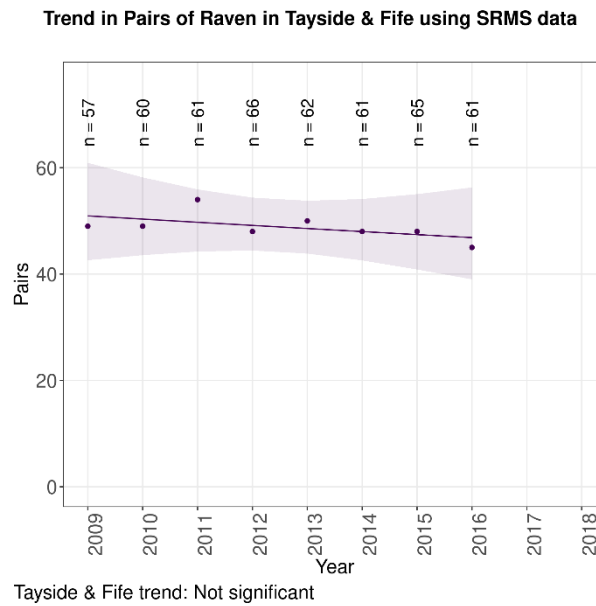
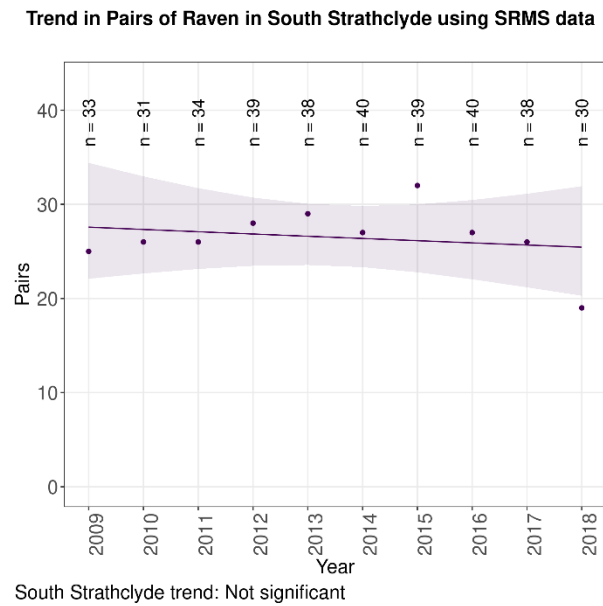
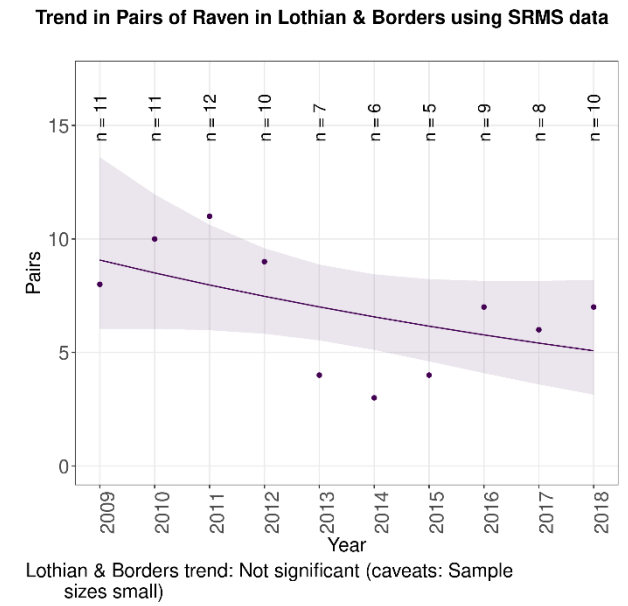
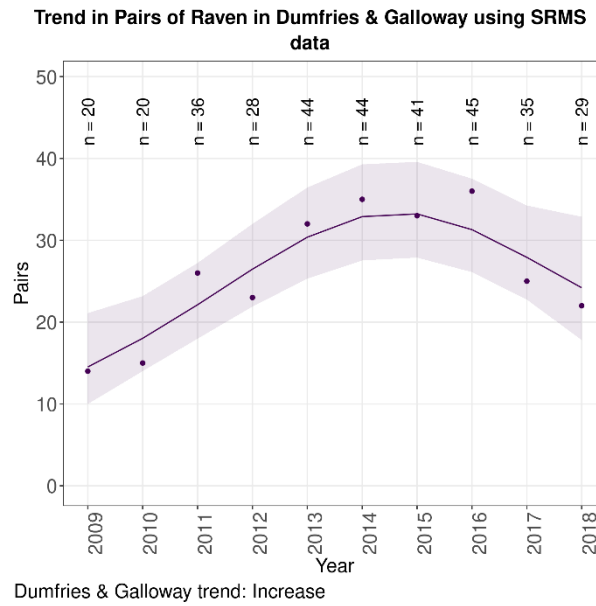
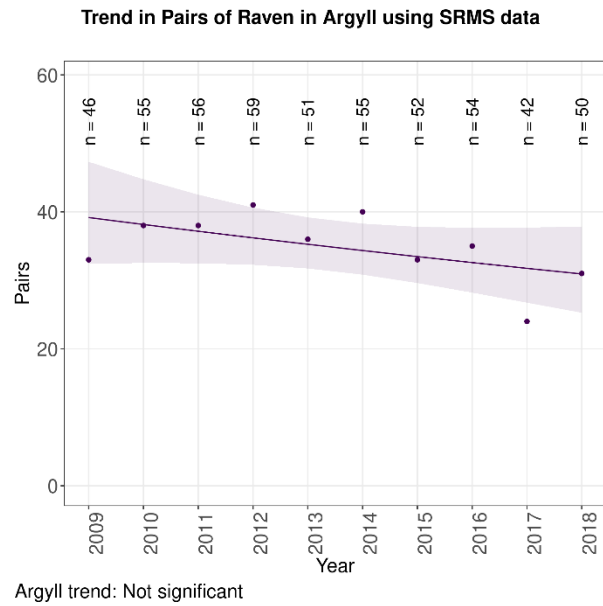
SRMS Region	Pairs	Success	Clutch size	Brood size	Number of fledglings
Argyll	Not significant	Not significant <sup>r</sup>	—	—	Not significant
Central	—	Not significant <sup>r</sup>	—	—	Not significant
Dumfries & Galloway	<b>Increase (5.4%)</b>	Not significant <sup>r</sup>	—	—	Not significant
Highland	—	Not significant <sup>s</sup>	—	—	Not significant <sup>s</sup>
Lewis & Harris	—	—	—	—	—
Lothian & Borders	Not significant <sup>s</sup>	Not significant <sup>r</sup>	—	—	Not significant
North East Scotland	—	—	—	—	—
Orkney	—	—	—	—	—
Shetland	—	—	—	—	—
South Strathclyde	Not significant	<b>Decrease <sup>r</sup> (-1%)</b>	—	—	Not significant
Tayside & Fife	Not significant	Not significant	—	—	Not significant
Uist	Not significant <sup>sv</sup>	Not significant <sup>s</sup>	—	—	Not significant <sup>s</sup>

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

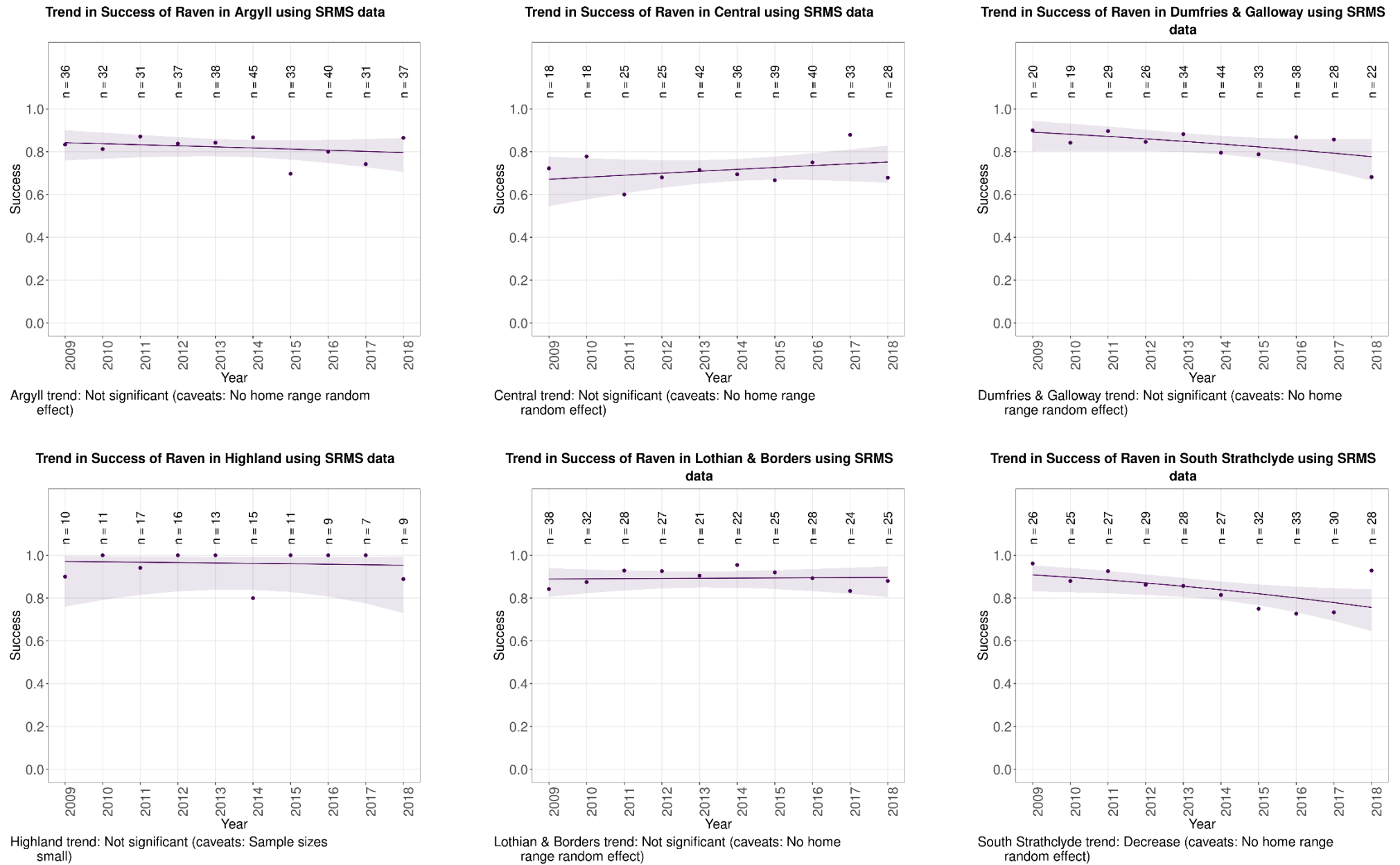
**Table 2:** Summary of NHZ regional trends for Raven during 2009-2018. Figures in parentheses indicate the annual change, with significant increases highlighted in green, significant decreases highlighted in blue and non-significant changes highlighted in grey. ‘—’ indicates where the species occurs 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	—	—	—	—	—
02. North Caithness and Orkney	—	—	—	—	—
03. Coll, Tiree and the Western Isles	Not significant <sup>v</sup>	Not significant	—	—	Not significant <sup>rs</sup>
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	Decrease <sup>s</sup> (-8.4%)	—	—	—	—
12. North East Glens	—	—	—	—	—
13. East Lochaber	—	—	—	—	—
14. Argyll West and Islands	Not significant <sup>v</sup>	Not significant	—	—	Not significant <sup>r</sup>
15. Loch Lomond, The Trossachs and Breadalbane	Not significant <sup>v</sup>	Not significant	—	—	Not significant <sup>r</sup>
16. Eastern Lowlands	Not significant <sup>sv</sup>	Not significant	—	—	Not significant <sup>r</sup>
17. West Central Belt	Not significant <sup>v</sup>	Not significant <sup>r</sup>	—	—	Not significant <sup>r</sup>
18. Wigtown Machairs and Outer Solway Coast	—	—	—	—	—
19. Western Southern Uplands and Inner Solway	Increase <sup>v</sup> (4.9%)	Not significant <sup>r</sup>	—	—	Not significant <sup>rs</sup>
20. Border Hills	Not significant <sup>v</sup>	Not significant <sup>r</sup>	—	—	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.



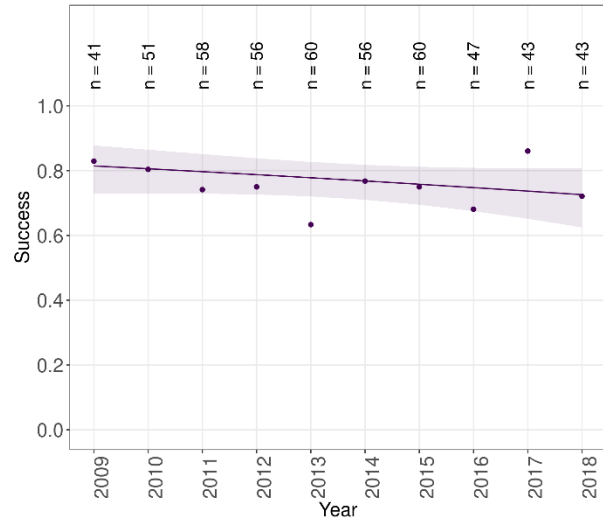
**Figure 2:** Trends in numbers of breeding pairs of Raven by SRMS region during 2009-2018.



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

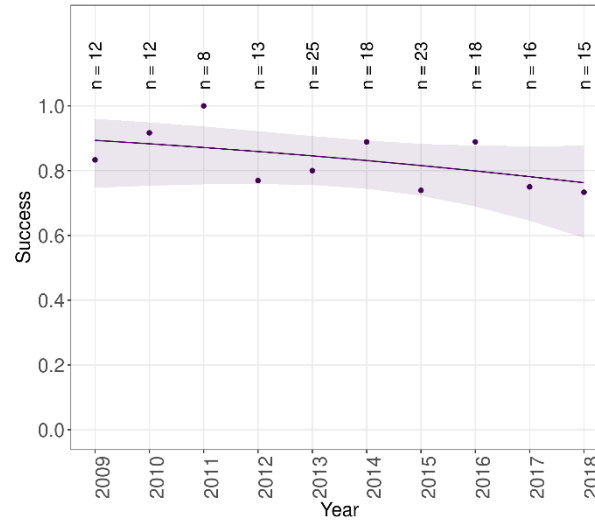


Trend in Success of Raven in Tayside & Fife using SRMS data



Tayside & Fife trend: Not significant

Trend in Success of Raven in Uist using SRMS data

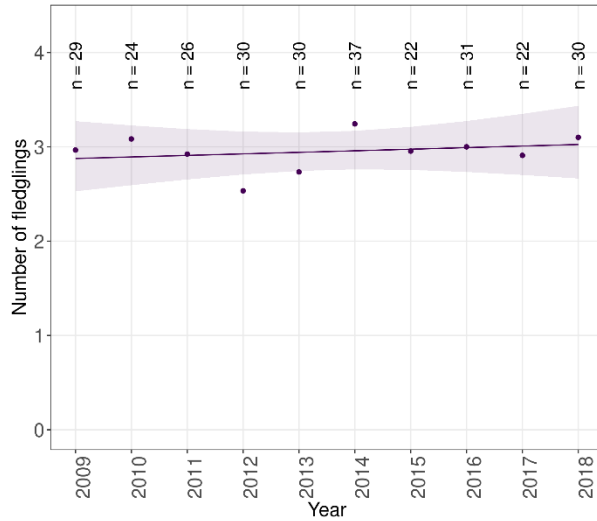


Uist trend: Not significant (caveats: Sample sizes small)

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

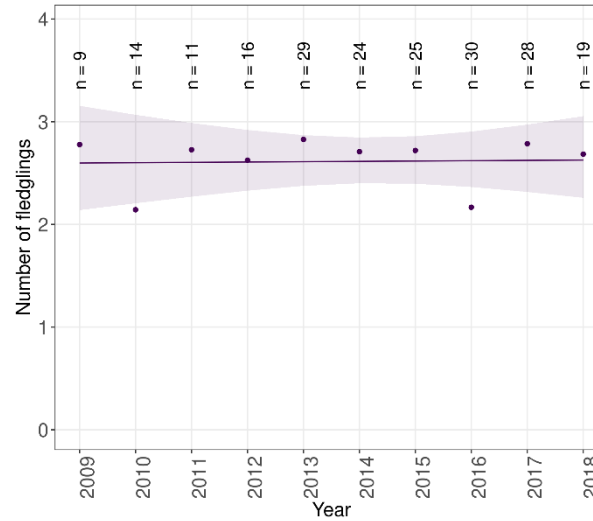


**Trend in Number of fledglings of Raven in Argyll using SRMS data**



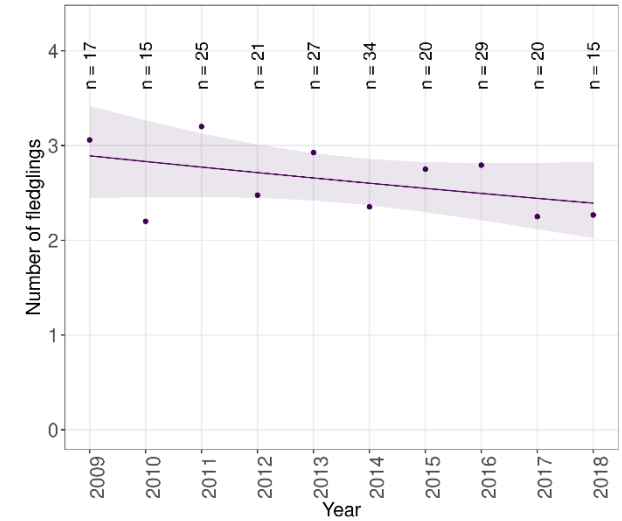
Argyll trend: Not significant

**Trend in Number of fledglings of Raven in Central using SRMS data**



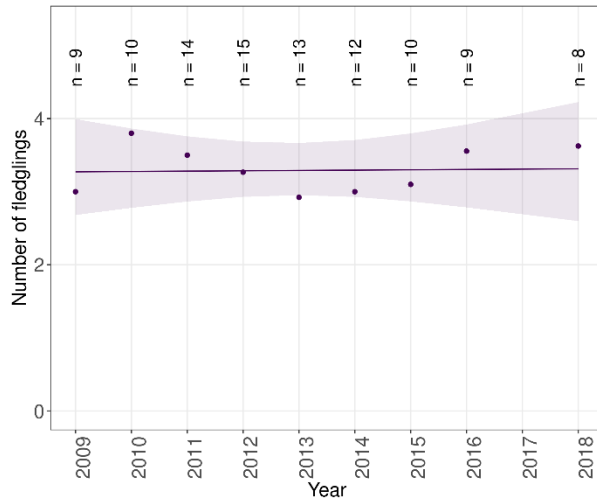
Central trend: Not significant

**Trend in Number of fledglings of Raven in Dumfries & Galloway using SRMS data**



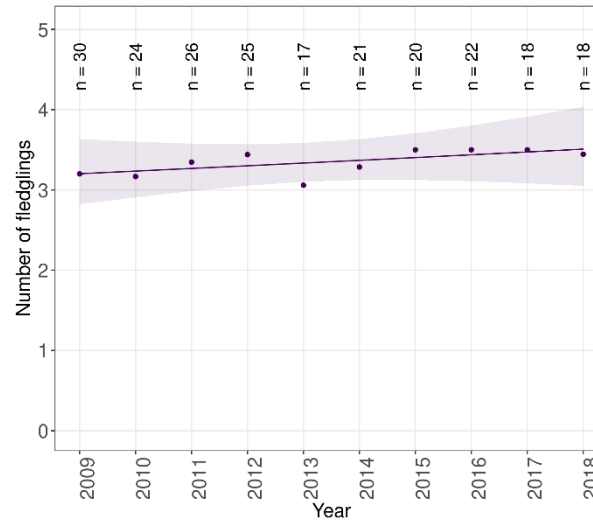
Dumfries & Galloway trend: Not significant

**Trend in Number of fledglings of Raven in Highland using SRMS data**



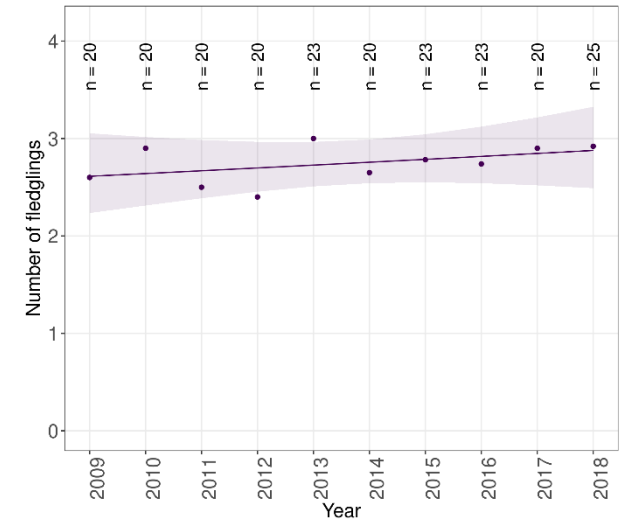
Highland trend: Not significant (caveats: Sample sizes small)

**Trend in Number of fledglings of Raven in Lothian & Borders using SRMS data**



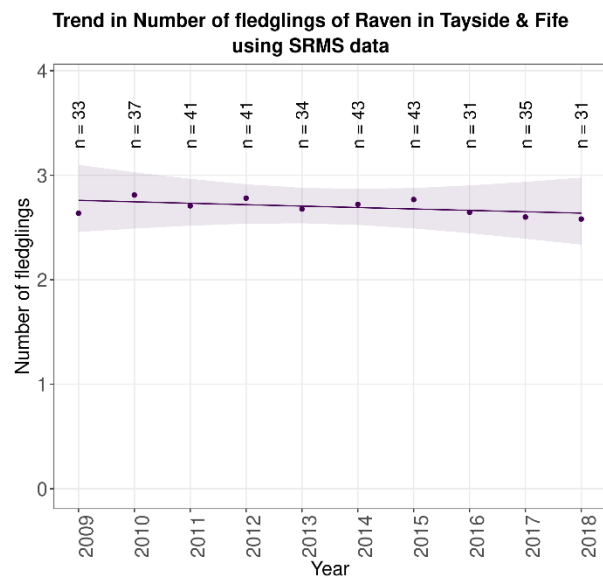
Lothian & Borders trend: Not significant

**Trend in Number of fledglings of Raven in South Strathclyde using SRMS data**

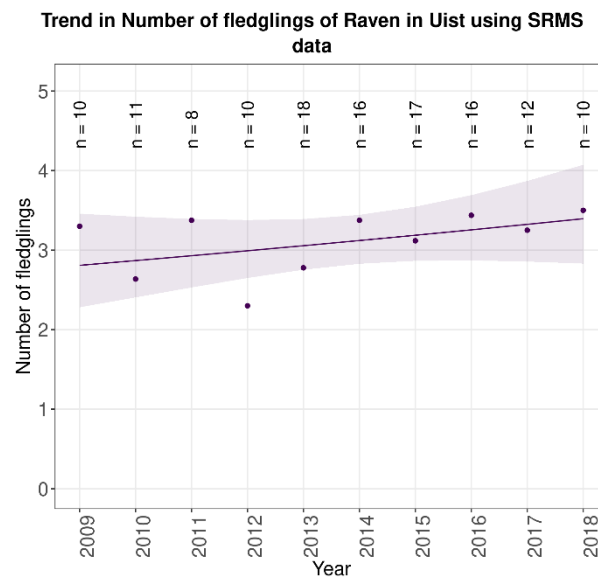


South Strathclyde trend: Not significant

**Figure 4:** Trends in numbers of fledglings of Raven by SRMS region during 2009-2018.

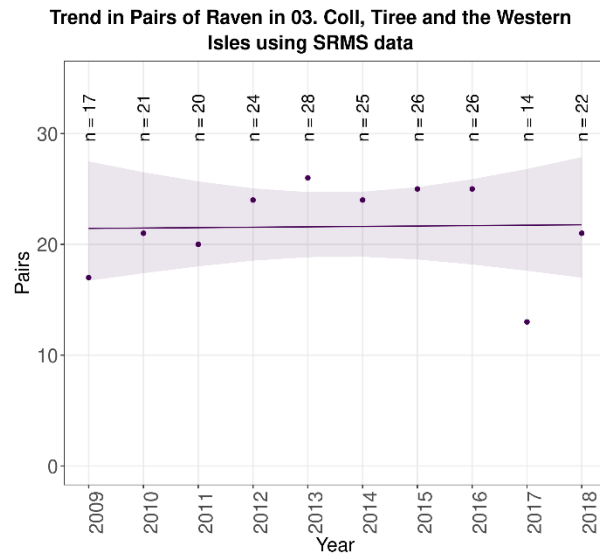


Tayside & Fife trend: Not significant

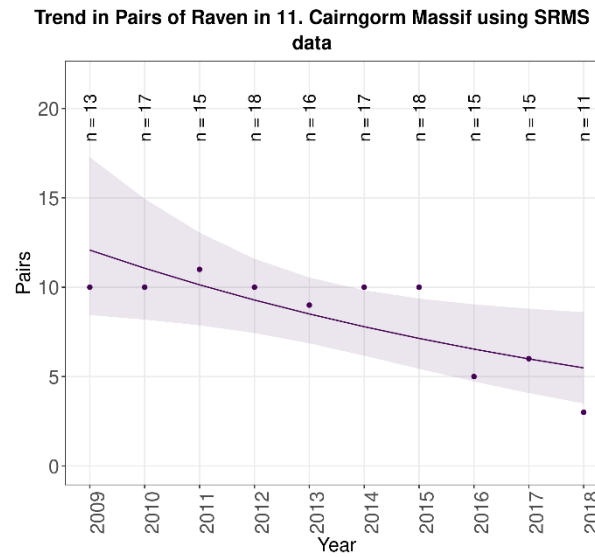


Uist trend: Not significant (caveats: Sample sizes small)

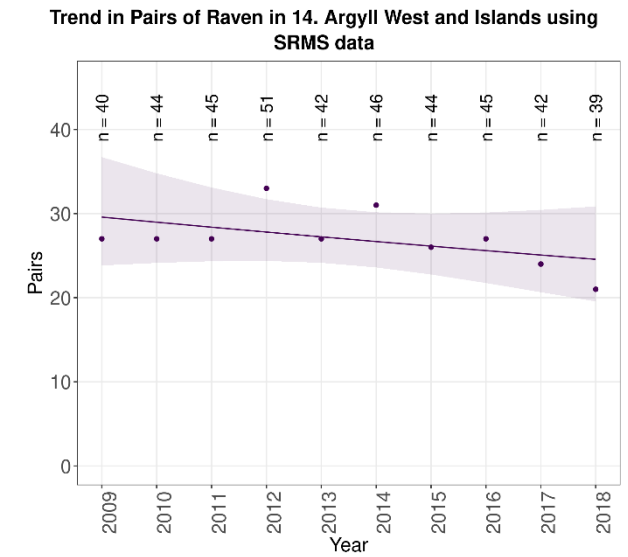
**Figure 4 continued:** Trends in numbers of fledglings of Raven by SRMS region during 2009-2018.



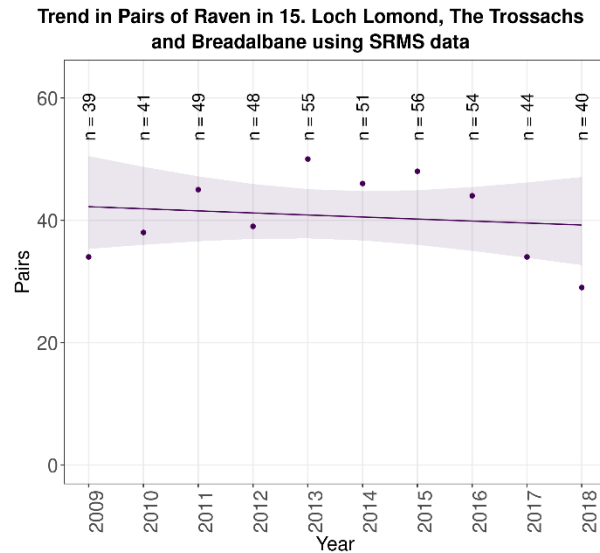
03. Coll, Tiree and the Western Isles trend: Not significant (caveats: Variable effort)



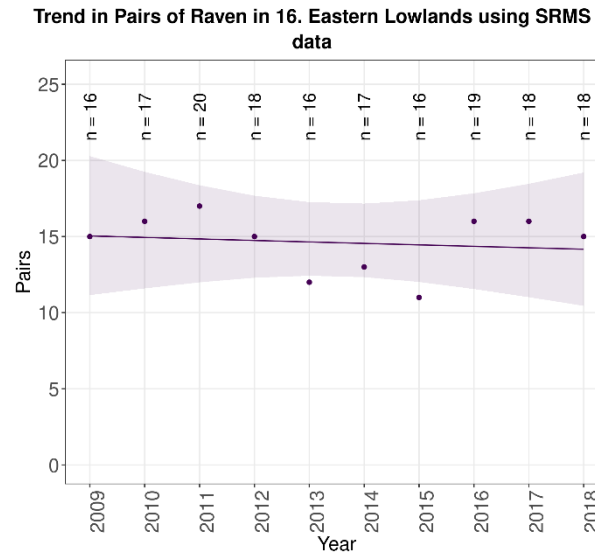
11. Cairngorm Massif trend: Decrease (caveats: Sample sizes small)



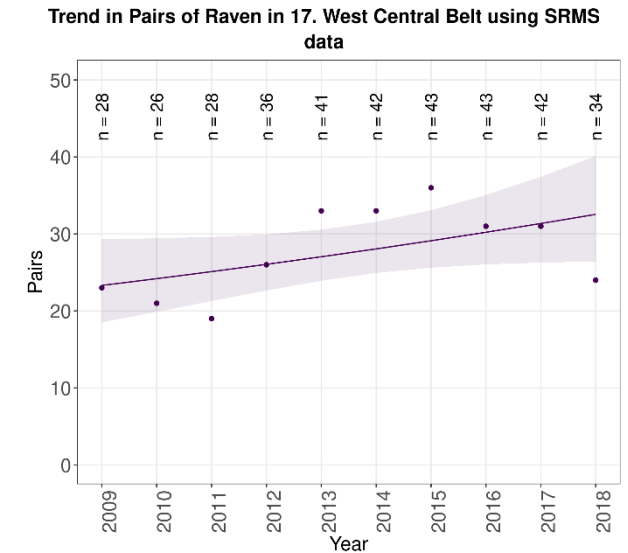
14. Argyll West and Islands trend: Not significant (caveats: Variable effort)



15. Loch Lomond, The Trossachs and Breadalbane trend: Not significant (caveats: Variable effort)



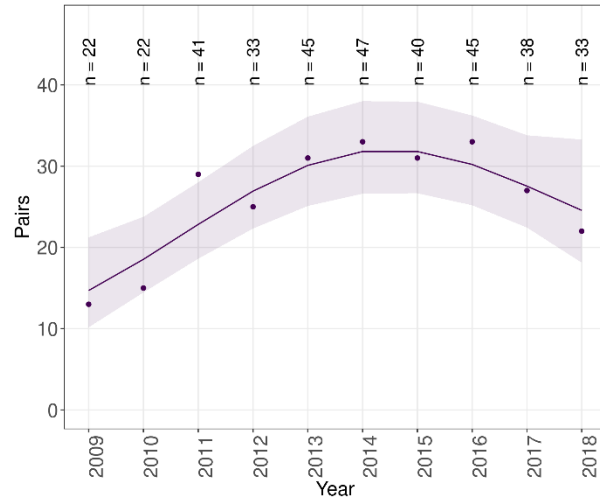
16. Eastern Lowlands trend: Not significant (caveats: Sample sizes small; Variable effort)



17. West Central Belt trend: Not significant (caveats: Variable effort)

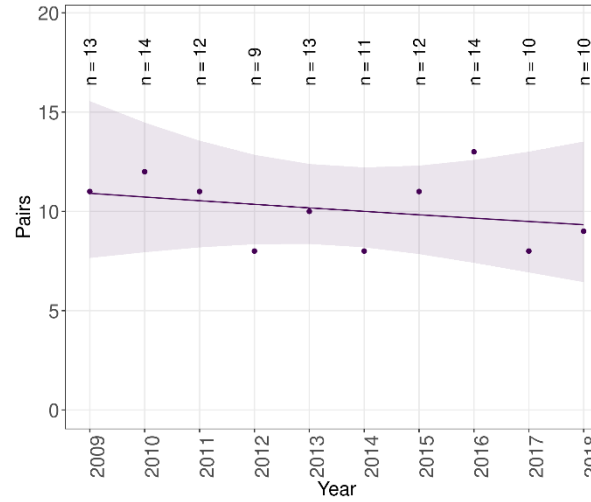
**Figure 5:** Trends in numbers of breeding pairs of Raven by NHZ region during 2009-2018.

Trend in Pairs of Raven in 19. Western Southern Uplands and Inner Solway using SRMS data



19. Western Southern Uplands and Inner Solway trend:  
Increase (caveats: Variable effort)

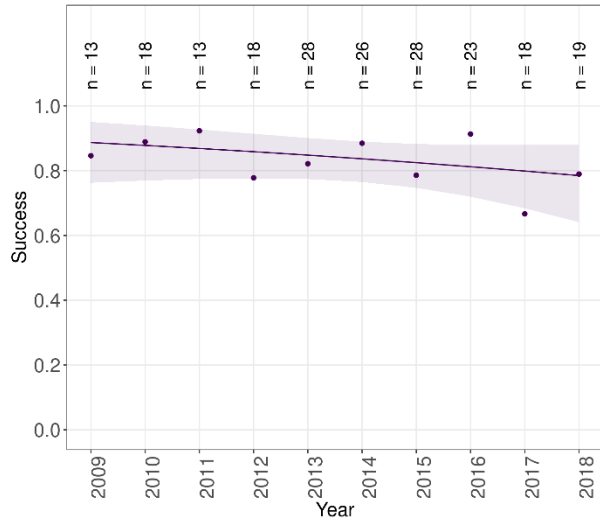
Trend in Pairs of Raven in 20. Border Hills using SRMS data



20. Border Hills trend: Not significant (caveats: Variable effort)

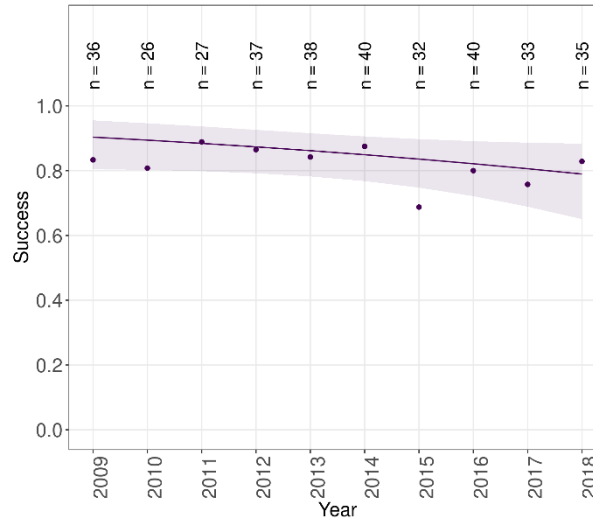
**Figure 5 continued:** Trends in numbers of breeding pairs of Raven by NHZ region during 2009-2018.

**Trend in Success of Raven in 03. Coll, Tiree and the Western Isles using SRMS data**



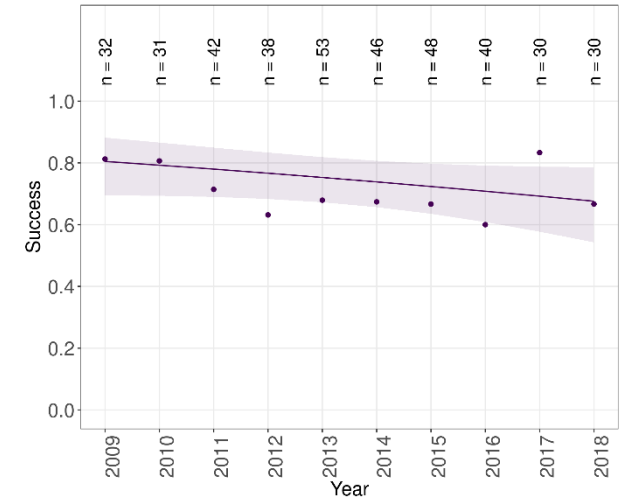
03. Coll, Tiree and the Western Isles trend: Not significant

**Trend in Success of Raven in 14. Argyll West and Islands using SRMS data**



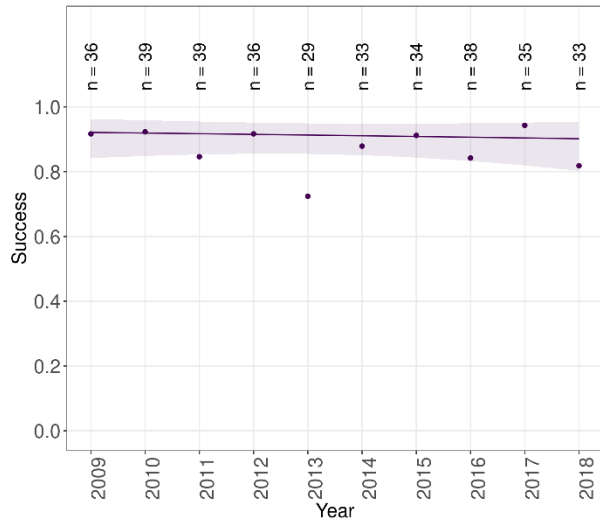
14. Argyll West and Islands trend: Not significant

**Trend in Success of Raven in 15. Loch Lomond, The Trossachs and Breadalbane using SRMS data**



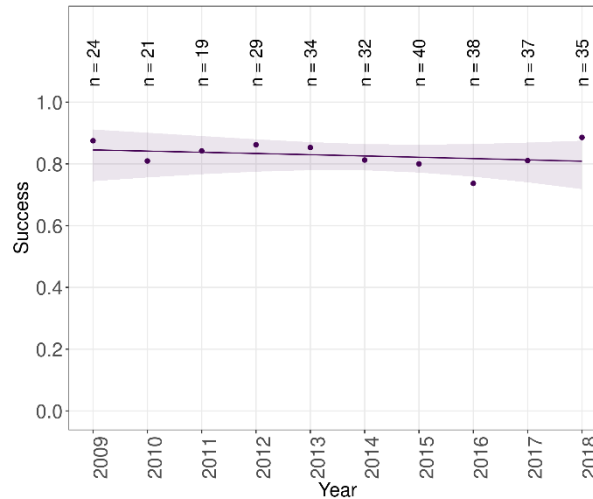
15. Loch Lomond, The Trossachs and Breadalbane trend: Not significant

**Trend in Success of Raven in 16. Eastern Lowlands using SRMS data**



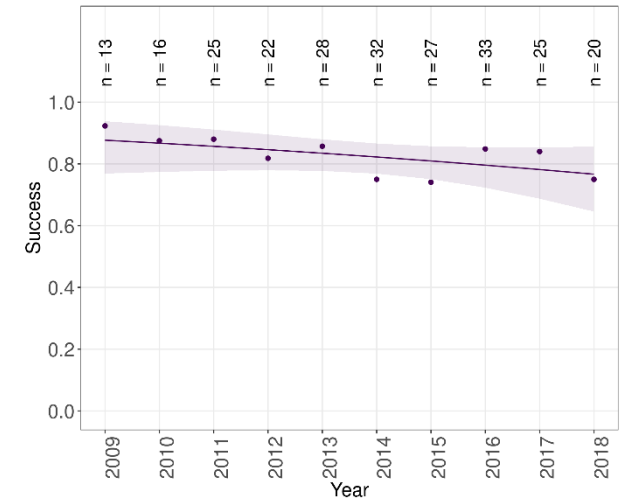
16. Eastern Lowlands trend: Not significant

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



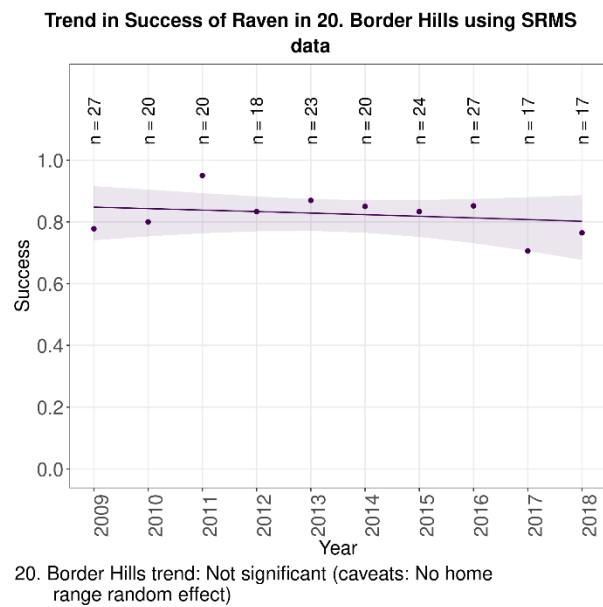
17. West Central Belt trend: Not significant (caveats: No home range random effect)

**Trend in Success of Raven in 19. Western Southern Uplands and Inner Solway using SRMS data**

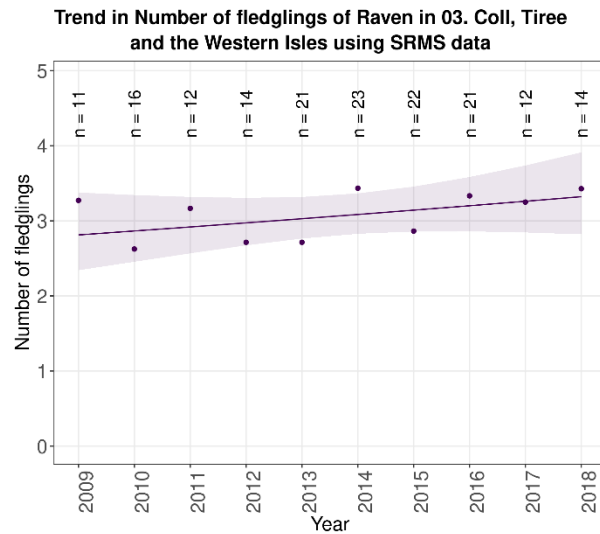


19. Western Southern Uplands and Inner Solway trend: Not significant (caveats: No home range random effect)

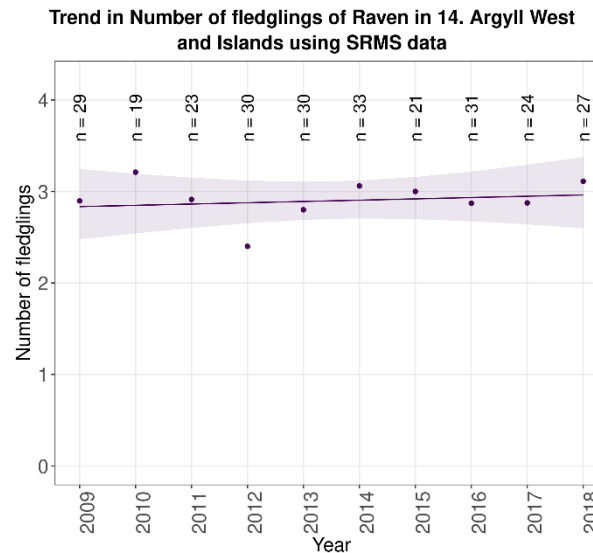
**Figure 6: Trends in breeding success of Raven by NHZ region during 2009-2018.**



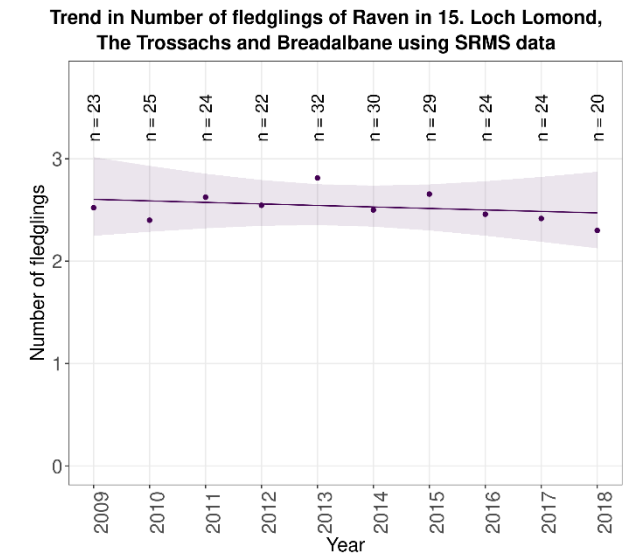
**Figure 6 continued:** Trends in breeding success of Raven by NHZ region during 2009-2018.



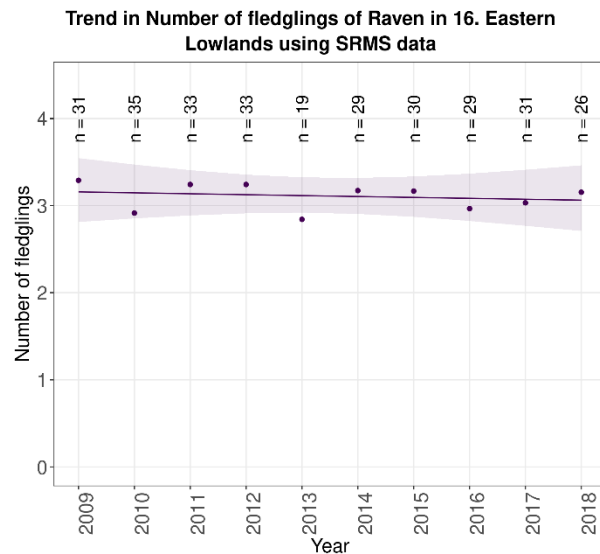
03. Coll, Tìree and the Western Isles trend: Not significant (caveats: Sample sizes small; No home range random effect)



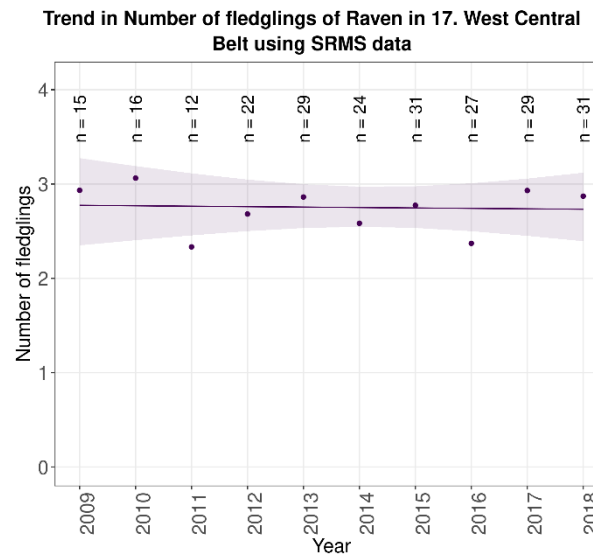
14. Argyll West and Islands trend: Not significant (caveats: No home range random effect)



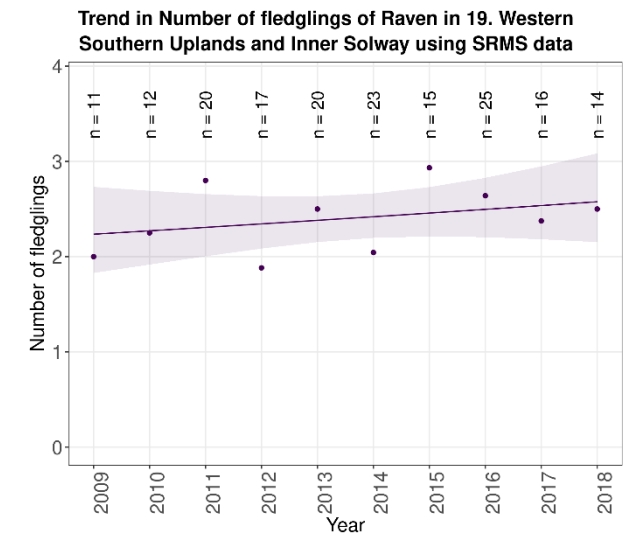
15. Loch Lomond, The Trossachs and Breadalbane trend: Not significant (caveats: No home range random effect)



16. Eastern Lowlands trend: Not significant (caveats: No home range random effect)



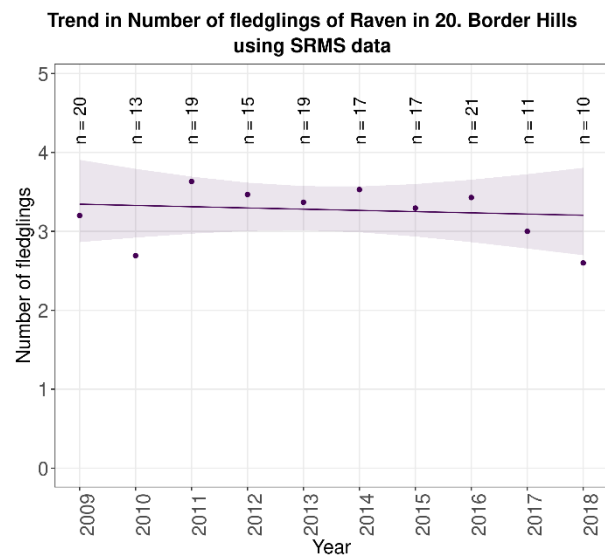
17. West Central Belt trend: Not significant (caveats: No home range random effect)



19. Western Southern Uplands and Inner Solway trend: Not significant (caveats: Sample sizes small; No home range random effect)

**Figure 7:** Trends in numbers of fledglings of Raven by NHZ region during 2009-2018.





20. Border Hills trend: Not significant (caveats: Sample sizes small; No home range random effect)

**Figure 8:** Trends in numbers of fledglings of Raven by NHZ region during 2009-2018.

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

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	Argyll	2009	2018	10	52.0	34.9 (31.3 to 38.5)	Not significant		-2.6 (-6.1 to 1.0)
	Dumfries & Galloway	2009	2018	10	34.2	26.1 (20.5 to 31.7)	Increase		5.4 (1.0 to 10.0)
	Lothian & Borders	2009	2018	10	8.9	6.9 (5.0 to 8.8)	Not significant	Sample sizes small	-6.3 (-13.7 to 1.9)
	South Strathclyde	2009	2018	10	36.2	26.5 (24.1 to 28.9)	Not significant		-0.9 (-5.0 to 3.4)
	Tayside & Fife	2009	2016	8	61.6	48.9 (46.8 to 51.0)	Not significant		-1.2 (-5.4 to 3.2)
	Uist	2009	2018	10	12.5	12.3 (10.5 to 14.1)	Not significant	Sample sizes small, Variable effort	3.8 (-2.4 to 10.4)
Success	Argyll	2009	2018	10	36.0	0.8 (0.8 to 0.9)	Not significant	No home range random effect	-0.5 (-1.8 to 0.8)
	Central	2009	2018	10	30.4	0.7 (0.7 to 0.8)	Not significant	No home range random effect	1.0 (-1.2 to 3.1)
	Dumfries & Galloway	2009	2018	10	29.3	0.8 (0.8 to 0.9)	Not significant	No home range random effect	-0.9 (-2.1 to 0.2)
	Highland	2009	2018	10	11.8	0.9 (0.9 to 1.0)	Not significant	Sample sizes small	-0.1 (-1.3 to 0.7)
	Lothian & Borders	2009	2018	10	27.0	0.9 (0.8 to 0.9)	Not significant	No home range random effect	0.1 (-1.3 to 1.3)
	South Strathclyde	2009	2018	10	28.5	0.8 (0.8 to 0.9)	Decrease	No home range random effect	-1.0 (-2.0 to -0.1)
	Tayside & Fife	2009	2018	10	51.5	0.7 (0.7 to 0.8)	Not significant		-0.8 (-2.1 to 0.4)
	Uist	2009	2018	10	16.0	0.8 (0.7 to 0.9)	Not significant	Sample sizes small	-1.0 (-2.7 to 0.5)
Number of fledglings	Argyll	2009	2018	10	28.1	3.0 (2.8 to 3.1)	Not significant		0.6 (-1.8 to 3.0)
	Central	2009	2018	10	20.5	2.6 (2.5 to 2.8)	Not significant		0.1 (-3.2 to 3.5)
	Dumfries & Galloway	2009	2018	10	22.3	2.7 (2.5 to 2.8)	Not significant		-2.1 (-5.1 to 1.0)
	Highland	2009	2018	9	11.1	3.3 (3.1 to 3.5)	Not significant	Sample sizes small	0.1 (-4.1 to 4.5)
	Lothian & Borders	2009	2018	10	22.1	3.3 (3.2 to 3.5)	Not significant		1.0 (-1.5 to 3.6)

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)
	South Strathclyde	2009	2018	10	21.4	2.7 (2.6 to 2.9)	Not significant		1.1 (-1.7 to 4.0)
	Tayside & Fife	2009	2018	10	36.9	2.7 (2.6 to 2.8)	Not significant		-0.5 (-2.7 to 1.8)
	Uist	2009	2018	10	12.8	3.1 (2.9 to 3.3)	Not significant	Sample sizes small	2.1 (-1.6 to 6.0)

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

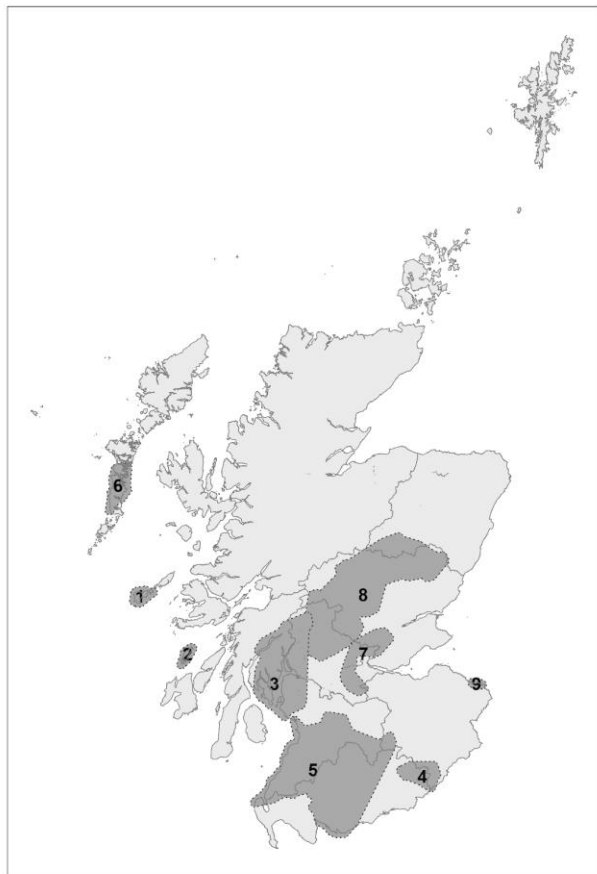
Parameter	Region	First year of trend	Last year of trend	Number of years	Mean number of home ranges across years	Mean parameter value (and 95% confidence limits)	Trend during the period	Caveats	Estimated % annual change (and 95% confidence limits)
Pairs	03. Coll, Tiree and the Western Isles	2009	2018	10	22.3	21.6 (18.7 to 24.5)	Not significant	Variable effort	0.2 (-4.4 to 4.9)
	11. Cairngorm Massif	2009	2018	10	15.5	8.4 (6.5 to 10.3)	Decrease	Sample sizes small	-8.4 (-15.1 to -1.2)
	14. Argyll West and Islands	2009	2018	10	43.8	27.0 (24.6 to 29.4)	Not significant	Variable effort	-2.0 (-6.0 to 2.1)
	15. Loch Lomond, The Trossachs and Breadalbane	2009	2018	10	47.7	40.7 (35.7 to 45.7)	Not significant	Variable effort	-0.8 (-4.1 to 2.6)
	16. Eastern Lowlands	2009	2018	10	17.5	14.6 (13.2 to 16.0)	Not significant	Sample sizes small; Variable effort	-0.7 (-6.1 to 5.1)
	17. West Central Belt	2009	2018	10	36.3	27.7 (23.5 to 31.9)	Not significant	Variable effort	3.8 (-0.4 to 8.1)
	19. Western Southern Uplands and Inner Solway	2009	2018	10	36.6	25.9 (20.8 to 31.0)	Increase	Variable effort	4.9 (0.6 to 9.5)
	20. Border Hills	2009	2018	10	11.8	10.1 (8.8 to 11.4)	Not significant	Variable effort	-1.7 (-8.2 to 5.2)
Success	03. Coll, Tiree and the Western Isles	2009	2018	10	20.4	0.8 (0.8 to 0.9)	Not significant		-0.8 (-2.4 to 0.6)
	14. Argyll West and Islands	2009	2018	10	34.4	0.8 (0.8 to 0.9)	Not significant		-0.9 (-2.0 to 0.1)
	15. Loch Lomond, The Trossachs and Breadalbane	2009	2018	10	39	0.7 (0.7 to 0.7)	Not significant		-1.2 (-2.7 to 0.3)
	16. Eastern Lowlands	2009	2018	10	35.2	0.9 (0.8 to 0.9)	Not significant		-0.2 (-1.1 to 0.7)

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)
	17. West Central Belt	2009	2018	10	30.9	0.8 (0.8 to 0.9)	Not significant	No home range random effect	-0.4 (-1.8 to 1.0)
	19. Western Southern Uplands and Inner Solway	2009	2018	10	24.1	0.8 (0.8 to 0.9)	Not significant	No home range random effect	-0.9 (-2.4 to 0.4)
	20. Border Hills	2009	2018	10	21.3	0.8 (0.8 to 0.9)	Not significant	No home range random effect	-0.5 (-2.1 to 1.1)
Number of fledglings	03. Coll, Tiree and the Western Isles	2009	2018	10	16.6	3.1 (2.9 to 3.2)	Not significant	Sample sizes small; No home range random effect	1.9 (-1.5 to 5.3)
Number of fledglings	14. Argyll West and Islands	2009	2018	10	26.7	2.9 (2.8 to 3.0)	Not significant	No home range random effect	0.5 (-2.0 to 3.0)
	15. Loch Lomond, The Trossachs and Breadalbane	2009	2018	10	25.3	2.5 (2.4 to 2.7)	Not significant	No home range random effect	-0.6 (-3.3 to 2.3)
	16. Eastern Lowlands	2009	2018	10	29.6	3.1 (3.0 to 3.2)	Not significant	No home range random effect	-0.3 (-2.5 to 1.9)
	17. West Central Belt	2009	2018	10	23.6	2.8 (2.6 to 2.9)	Not significant	No home range random effect	-0.2 (-3.0 to 2.7)
	19. Western Southern Uplands and Inner Solway	2009	2018	10	17.3	2.4 (2.3 to 2.6)	Not significant	Sample sizes small; No home range random effect	1.6 (-2.0 to 5.4)
	20. Border Hills	2009	2018	10	16.2	3.3 (3.1 to 3.5)	Not significant	Sample sizes small; No home range random effect	-0.5 (-3.5 to 2.7)

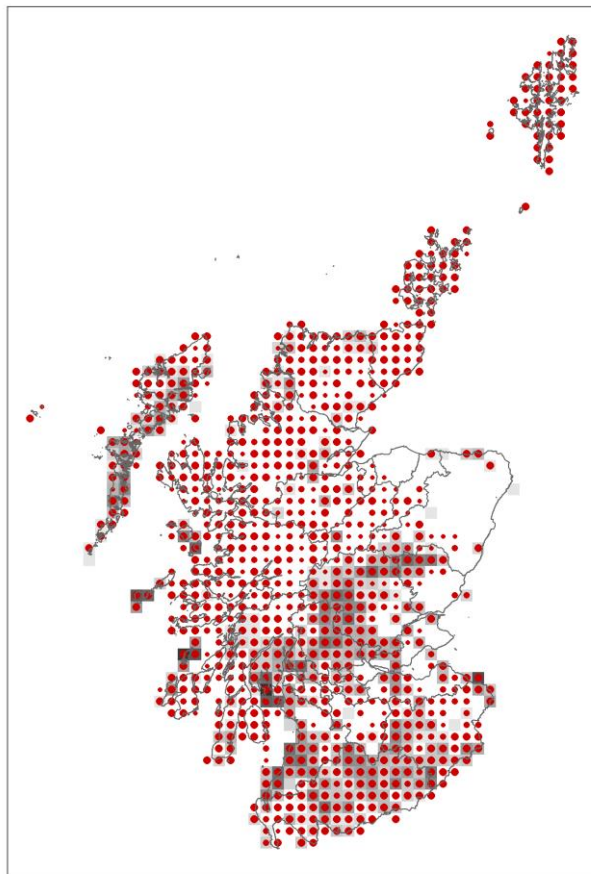
**Table 5:** Number of Raven home range checks for occupancy reported to the SRMS during 2009-2018, in each of the 12 SRMS Regions, with approximate proportion of estimated population monitored. At the bottom of the table, row A is the mean number of home range checks over the most recent five years. 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.

	ARGYLL	CENTRAL SCOTLAND	DUMFRIES & GALLOWAY	HIGHLAND	LEWIS & HARRIS	LOTHIAN & BORDERS	NORTH EAST SCOTLAND	ORKNEY	SHETLAND	SOUTH STRATHCLYDE	TAYSIDE & FIFE	UIST	Total
Year													
2009	99	31	49	23	16	53	0	0	0	47	74	14	406
2010	77	29	65	26	50	58	0	0	0	45	75	14	439
2011	67	43	82	27	5	43	0	0	0	52	80	11	410
2012	67	45	47	29	8	34	8	0	0	60	92	15	405
2013	72	77	87	28	5	40	26	0	0	45	94	44	518
2014	83	71	106	40	8	41	28	0	0	57	105	38	577
2015	73	75	83	38	3	51	0	0	37	55	105	36	556
2016	92	78	94	23	7	62	1	34	38	60	105	38	632
2017	73	62	84	42	10	45	1	28	46	61	97	32	581
2018	103	53	84	39	9	56	0	1	49	50	108	33	585
A: Mean home range checks	84.8	67.8	90.2	36.4	7.4	51.0	6.0	12.6	34.0	56.6	104.0	35.4	586.2
B: Proportion of estimated Scottish population	19	3	7	25	7	3	2	8	8	7	5	6	100

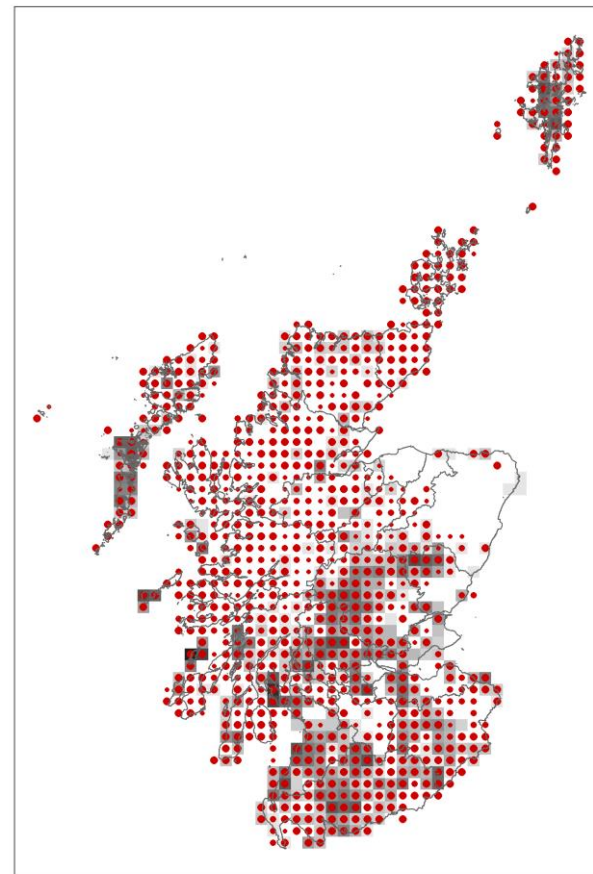
a)



b)



c)



**Figure 9:** Areas corresponding to the clusters of home ranges from which sufficient data were reported to attempt to derive population trends for Raven between 2009 and 2018 (a) together with maps showing variation in the number of Raven records reported to SRMS during 2009-2013 (b) and 2014-2018 (c), in the context of the known Raven 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.