

RING OUZEL REPORT 2017



FINDINGS OF A STUDY OF RING OUZEL *Turdus torquatus* TERRITORIES IN ROSEDALE AND OTHER AREAS OF THE NORTH YORK MOORS

Summary of 2017 Report on Page 3

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CONTENTS

1. SUMMARY OF 2016 RING OUZEL REPORT	3
2. INTRODUCTION.....	4
3. METHODOLOGY.....	5
3.1 Breeding Status Criteria.....	5
3.2 Fledging Criteria.....	5
3.3 Definition of Study Area	5
4. RESULTS.....	6
4.1 Territories.....	6
4.1.1 Rosedale Area	6
4.1.2 Other Areas of the North York Moors.....	6
4.2 Nest Sites.....	7
4.3 Annual Breeding Results	8
4.4 First-egg Laying Dates.....	9
4.5 First-egg, Hatching & Fledging Dates.....	10
4.6 Distance Between First & Second Nests	13
5. DISCUSSION.....	14
5.1 Climate	14
5.1.1 Local Weather Observations.....	14
5.1.2 Regional Values.....	16
5.2 First Arrivals	16
5.3 Rosedale Territories and Nests	17
5.3.1 Bank Top.....	18
5.3.2 Blakey Lion.....	18
5.3.3 Dalehead quarry.....	18
5.3.4 Dalehead north & west.....	18
5.3.5 East Mines	20
5.3.6 Hob Crag north.....	20
5.3.7 Hob Crag quarry.....	20
5.3.8 Hob Crag west	21
5.3.9 Loskey Beck south.....	21
5.3.10 Loskey Side ford	21
5.3.11 Matty Carr quarry	22
5.3.12 Matty Carr west.....	22
5.3.13 Nab Scar	23
5.3.14 Reeking Gill.....	23
5.3.15 Reeking Gill south	24
5.3.16 Round Hill south.....	25
5.3.17 Round Hill west	25
5.3.18 Sheriff's Pit north.....	26
5.3.19 Sledge Shoe.....	26
5.3.20 Sturdy Bank.....	27
5.3.21 Thorgill Bank east	27
5.3.22 Thorgill Bank west.....	28
5.4 Breeding Productivity	28
5.5 Late:Early Territory Occupancy	30
5.6 Nest Aspect.....	31
5.7 Nest Elevation	32
5.8 Spring Passage Migrants	32
5.9 Late Summer Activity	32
6. ACKNOWLEDGEMENTS	33
7. REFERENCES.....	33
ANNEX 1 - Map of Nest Sites and Territories in the Rosedale Area in 2017	34
ANNEX 2 - Map of Sightings on the North York Moors in 2017	35
ANNEX 3 - Table of Annual Breeding Results from 2000 to 2017	36
ANNEX 4 - Table of Nest Aspect and Elevation from 1999 to 2017.....	38
ANNEX 5 - Table of Late:Early Territory Occupancy from 2008 to 2017	40
ANNEX 6 - Graphs of Daily Temperature and Rainfall for the Months March to June 2017.....	41

Front-page photo: Hob Crag, Rosedale, male Ring Ouzel taking-off, 3rd May 2017 – Peter Thomson.

1. SUMMARY OF 2017 RING OUZEL REPORT

- 1. First-arrival at Dalehead on 22nd March; a day later than earliest recorded in 2012/14 (5.2, Pg. 16)**
 - 2. 17 territories recorded in 2017; up from 13 in 2016 but below peak of 23 in 2012 (5.3, Pg. 17)**
 - 3. Two early nests found predated; one at egg stage, one at chick stage (5.4, Pg. 28)**
 - 4. Nest productivity below long-term average in 5 of the last 6 years (5.4, Pg. 28)**
 - 5. 50% of breeding pairs had a late nest, just slightly below the long-term average (5.5, Pg. 30)**
 - 6. Pairs having a late nest below long term average in last 4 years (5.7, Pg. 30)**
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2. INTRODUCTION

The 2017 survey was the 18th year in which a detailed study had been made of the Ring Ouzel *Turdus torquatus* (RZ) population in the North York Moors National Park; only the foot and mouth outbreak in 2001 and the subsequent closure of the moors, preventing what would have been 19 years of continuous study since the start of the project in 1999.

The findings of these studies were submitted to various bodies including the North York Moors National Park Authority, the RSPB Ring Ouzel Study Group, Natural England (York office) and the land-owners and head keepers of Spaunton and Rosedale estates.

As in previous years the 2017 survey concentrated mainly on recording Ring Ouzel activity in the Rosedale area of the North York Moors; an area of around 25 square kilometres. Reports of Ring Ouzel sightings in other parts of the National Park have been included with their approximate location shown on a map of the area. Sightings of birds that are considered to be passage migrants that appear annually across the Moors and along the coast have been excluded from the map.

Finally, the north-west and east side of Rosedale was covered by Vic Fairbrother and the west side by Ken Hutchinson.

3. METHODOLOGY

3.1 Breeding Status Criteria

The criteria used to determine the existence of a territory is shown in the table below using the categories defined by the British Trust for Ornithology (BTO) for determining breeding evidence.

BREEDING STATUS	CRITERIA
Possible	<ul style="list-style-type: none">• Single bird observed in suitable nesting habitat.• Male seen or heard singing on one survey date only.
Probable	<ul style="list-style-type: none">• Male observed singing on two different days in a week or more at the same place.• Territorial behaviour observed on two or more days.• Pair observed in suitable nesting habitat.• Nest-building activity.• Agitated behaviour.
Confirmed	<ul style="list-style-type: none">• Nest found with eggs or chicks.• Recently fledged young seen.• Adult seen carrying food.

3.2 Fledging Criteria

An assessment of whether a brood fledged successfully is made using the ‘outcome success’ criteria of the BTO Nest Record Scheme as appropriate.

- Young fledged nest on approach.
- Fledged young near nest.
- Adult carrying food to fledged young near nest.
- Adult visibly agitated/alarming as if fledged young are near nest.
- Nest empty and undisturbed with well-trodden lining, containing feather scale and/or droppings.
- Young capable of leaving nest on penultimate visit.

Ring Ouzel chicks remain relatively settled when in the nest but can ‘explode’ from the nest when approached close to fledging. For that reason, nests are not generally inspected the day before the estimated fledging date in order to avoid this premature fledging.

In view of this and unless there is evidence to the contrary, such as obvious signs of predation, all nestlings present on the penultimate visit are considered to have fledged if the nest is empty on the later final visit.

The discovery of small groups of droppings in sheltered locations in the vicinity of the nest has also been noted as supporting evidence that fledglings have been hidden there for a time after leaving the nest.

3.3 Definition of Study Area

References in this report to the **Rosedale area** include the main dale (valley) of Rosedale and adjoining Spaunton Moor (Loskey Ridge, Loskey Side, Spaunton Knowl, Spindle Thorn). References to **Rosedale** refer only to the main dale of Rosedale.

4. RESULTS

4.1 Territories

4.1.1 Rosedale Area

Table 1: Confirmed and Probable Ring Ouzel territories in the Rosedale area between 1999 and 2017

	Location (all territories recorded to date)	NGR	Year																	
			99	00	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
1.	Spaunton Moor - Spindle Thorn	SE 716 930	?	*	✓	*	*	*	*	*	✓	*	*	?	✓	✓	*	*	✓	✓
2.	Spaunton Moor - Spaunton Knowl	SE 717 918	?	?	?	?	?	?	?	?	?	?	?	?	✓	*	*	*	*	*
3.	Spaunton Moor - Loskey Side (ford)	SE 708 933	?	?	?	?	?	?	?	?	?	?	?	?	*	✓	*	*	*	✓
4.	Spaunton Moor - Loskey Beck (ford)	SE 714 934	?	✓	✓	✓	*	*	✓	*	*	*	*	?	*	*	*	*	*	*
5.	Spaunton Moor - Loskey Beck east	SE 715 935	?	*	*	✓	✓	✓	*	*	*	*	*	?	*	*	*	*	*	*
6.	Spaunton Moor - Loskey Beck south	SE 713 931	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	✓	*	✓
7.	Rosedale west - Bank Top	SE 720 951	✓	✓	✓	✓	*	*	✓	*	*	*	*	✓	✓	✓	✓	✓	✓	
8.	Rosedale west - Bank Top east	SE 725 945	?	*	*	✓	*	✓	*	*	*	*	*	*	*	*	✓	*	*	
9.	Rosedale west - Hob Crag quarry	SE 714 954	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
10.	Rosedale west - Hob Crag north	SE 712 956	*	*	*	*	*	*	*	*	*	*	*	✓	*	✓	*	✓	*	✓
11.	Rosedale west - Hob Crag west	SE 711 953	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓
12.	Rosedale west - Thorgill Bank quarry	SE 707 958	?	*	*	✓	*	*	✓	*	*	*	*	*	✓	✓	✓	✓	✓	*
13.	Rosedale west - Thorgill Bank west	SE 705 957	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	✓	✓
14.	Rosedale west - Thorgill Bank east	SE 711 958	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓
15.	Rosedale west - Thorgill Head	SE 670 956	?	*	✓	✓	✓	✓	✓	*	*	*	*	*	*	*	✓	✓	*	*
16.	Rosedale west - Sheriff's Pit	SE 697 963	✓	✓	✓	*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
17.	Rosedale west - Sheriff's Pit north	SE 697 964	*	*	*	*	*	*	*	*	*	*	*	*	✓	*	*	*	*	✓
18.	Rosedale west - Sheriff's Pit south	SE 698 961	*	*	*	*	*	*	✓	*	*	*	*	*	*	*	*	*	*	*
19.	Rosedale west - Round Hill south	SE 694 968	?	*	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	*	✓	✓	✓	✓	✓
20.	Rosedale west - Round Hill west	SE 693 971	*	*	✓	*	*	*	*	*	*	*	*	✓	✓	✓	✓	✓	✓	✓
21.	Rosedale west - Round Hill north	SE 693 974	?	*	*	*	*	*	*	✓	*	*	*	*	*	*	*	*	*	*
22.	Rosedale west - Round Hill east	SE 694 970	?	*	✓	✓	✓	*	*	✓	✓	✓	✓	✓	✓	*	✓	✓	✓	*
23.	Rosedale west - Sledge Shoe Bents	SE 691 978	?	✓	✓	✓	✓	✓	✓	*	*	✓	*	✓	✓	✓	✓	✓	✓	✓
24.	Rosedale west - Matty Carr quarry	SE 688 984	?	*	*	✓	✓	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	*	✓	*
25.	Rosedale west - Matty Carr south	SE 690 980	?	*	*	*	*	*	✓	*	✓	*	*	*	✓	*	*	✓	*	*
26.	Rosedale west - Matty Carr west	SE 687 983	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓
27.	Rosedale west - Lion Inn north	SE 680 999	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	*	*	*	*
28.	Rosedale west - Lion Inn south	SE 681 999	*	✓	✓	✓	*	✓	*	✓	*	*	*	*	✓	✓	✓	✓	*	*
29.	Rosedale west - Blakey Swang	SE 685 998	?	?	?	?	?	?	?	?	✓	*	*	*	*	*	*	*	*	*
30.	Rosedale west - Dalehead north	NZ 680 013	✓	*	✓	*	✓	*	*	*	✓	*	✓	✓	✓	*	✓	*	*	*
31.	Rosedale west - Dalehead west	NZ 680 008	*	*	✓	✓	✓	✓	✓	✓	*	✓	*	✓	✓	✓	*	*	✓	*
32.	Rosedale east - Dalehead east	NZ 686 008	*	*	*	✓	✓	✓	*	*	*	*	*	*	*	*	*	*	*	✓
33.	Rosedale west - Dalehead south	NZ 682 005	*	*	✓	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
34.	Rosedale east - Dalehead quarry east	NZ 685 006	*	*	*	*	*	*	*	*	*	*	*	✓	*	*	*	*	*	✓
35.	Rosedale east - Dalehead quarry west	NZ 683 008	*	*	*	*	*	*	*	*	*	*	*	✓	✓	✓	✓	*	✓	*
36.	Rosedale east - Reeking Gill cutting	NZ 689 007	*	*	*	*	*	*	*	*	✓	✓	*	✓	*	✓	✓	*	*	*
37.	Rosedale east - Reeking Gill west	NZ 690 007	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	*	*	*
38.	Rosedale east - Reeking Gill	NZ 691 007	✓	✓	✓	*	*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	✓
39.	Rosedale east - Reeking Gill quarry	NZ 692 005	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	✓	*	*	*
40.	Rosedale east - Reeking Gill south	NZ 692 003	*	*	*	*	*	*	*	*	*	*	*	✓	✓	✓	✓	*	*	*
41.	Rosedale east - Nab Scar north	NZ 694 000	*	✓	*	✓	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	*	✓	*	*
42.	Rosedale east - Nab Scar south	SE 695 999	*	*	*	*	*	*	*	*	*	*	✓	*	✓	*	✓	*	*	*
43.	Rosedale east - Sturdy Bank	SE 698 999	✓	✓	✓	✓	*	*	*	*	✓	✓	✓	✓	✓	✓	✓	✓	*	✓
44.	Rosedale east - East Mine	SE 705 989	?	?	?	?	?	?	?	?	?	✓	*	*	*	✓	*	*	*	*
TOTAL			5	9	16	16	12	13	12	11	12	9	12	16	23	20	21	17	13	17

1). Only a partial survey was carried out in 1999. 2). Foot & mouth prevented field-work in 2001.

✓ = occupied by pair * = not occupied ? = not checked

4.1.2 Other Areas of the North York Moors

The map at **Annex 2** shows the approximate location where Ring Ouzels were recorded on the North York Moors in 2017 - other than the Rosedale area and passage migrants.

4.2 Nest Sites

Table 2: Summary of Ring Ouzel nest sites monitored in 2017.

No.	Location	Grid Ref.	Outcome	Comment
1.	Rosedale west - Round Hill west	SE69259704	Fledged	2 nd nest.
2.	Rosedale west - Thorgill Bank east	SE70939583	Fledged	1 st nest.
3.	Rosedale west - Sheriff's Pit north	SE69669645	Predated	1 st nest.
4.	Rosedale west - Sheriff's Pit north	SE69709642	Fledged	Replacement nest.
5.	Rosedale west - Hob Crag north	SE71219559	Fledged	1 st nest.
6.	Rosedale west - Hob Crag west	SE71139530	Destroyed	2 nd nest. Eggs broken in nest.
7.	Rosedale west - Matty Carr west	SE68709833	Fledged	1 st nest.
8.	Rosedale west - Dalehead west	NZ67900080	Fledged	1 st nest.
9.	Rosedale west - Loskey Side ford	SE70809330	Fledged	2 nd nest.
10.	Rosedale east - Reeking Gill	NZ69200080	Abandoned	2 nd nest. Likely 2 day old chicks chilled from prolonged period of rain.
11.	Rosedale east - Sturdy Bank	SE69869996	Predated	1 st nest.
12.	Farndale east - High Blakey Moor	SE65859985	Fledged	1 st nest.

Further details of Rosedale territories and nests can be found in sections: 4.5, 4.6, 5.3 and Annex 3 and 4.

4.3 Annual Breeding Results

Table 3: Summary of annual breeding results at Ring Ouzel nest sites in Rosedale and other areas of the North York Moors between 2000 and 2017. (Detailed results are presented at **Annex 3**)

Year	Nests Monitored	Successful nests	Laying pairs (2 nd clutch)	Pairs that hatched young (2 nd attempt) [2 nd brood]	Pairs that successfully fledged young (2 nd attempt/brood)	Pairs that failed to fledge young	Total young fledged	Mean fledged young per successful nest ^a	Mean fledged young per laying pair ^b
1	2	3	4	5	6	7	8	9	10
00	1	1	1	1	1	0	4	4.00	4.00
02	1	1	1 (1)	1 (1)	1 (1)	0	4	4.00	4.00
03	7	3	6 (1)	4 [1]	3	3	11	3.66	1.83
04	4	2	4 (1)	4 (1)	2 (1)	2	8	4.00	2.00
05	6	4	4 (2)	4 (1)[1]	4 (2) ^c	0	13	3.25	3.25
06	3	1	2	1 (1)	1 (1) ^d	1	5	5.00	2.50
07	4	3	4	3	3	1	12	4.00	3.00
08	9	6	7(3)	7[2] ^e	5(1)	2	23	3.83	3.29
09	5	5	4(1)	4[1]	4(1)	0	19	3.80	4.75
10	12	9	8 (5)	7 [3]	7(2)	1	30	3.33	3.75
11	19	15	14 (8)	13 [8]	12 (5)	2	55	3.67	3.92
12	13	7	11 (5)	6 (1)[3]	6 (2)	5	23	3.28	2.09
13	16	13	10 (6)	9 (1) [6]	9 (5) ^f	1	40	3.08	4.00
14	20 ^g	11	15 (5)	12 (1)[3]	10 (2)	5	40	3.64	2.86
15	13	9 ^h	12 (3)	9 (2) [1]	8 (3)	4	27	3.00	2.25
16	6	9 ^h	9 (3)	9 [3]	8 (3)	1	23	2.56	2.55
17	12	9 ^h	10 (5)	9 (1) [3]	8 (3)	2	30	3.33	3.00
Overall Mean								3.61ⁱ	3.12
Note									
<p>a. Mean fledged young per successful nest (Column 9) = Column 8 ÷ Column 3 b. Mean fledged young per laying pair (Column 10) = Column 8 ÷ Column 4 c. A pair had two unsuccessful attempts before being successful at the third attempt. d. A pair had one unsuccessful attempt before being successful at second attempt. e. A pair had two unsuccessful attempts; 1st was predated at the chick stage, 2nd at the egg stage. f. A pair had four nests; 1st was abandoned, 2nd was predated at egg stage, 3rd & 4th were successful. g. The outcome of two nests located in Esklets is unknown as no final visit was made. h. Also includes nests that were not located but where recently fledged young were seen or where adults were seen feeding hidden young i. Mean: Glen Esk (Burfield) 3.48; Moorfoots (Burfield) 3.50; Yorkshire Dales (Appleyard) 3.60; BTO Nest Records (Flegg & Glue) 3.60.</p>									

Interpreting Table 3

- Column 2 shows the total number of nests found and monitored that year.
- Column 3 shows the number of nests fledging young (i.e. successfully leaving the nest) that year.
- Column 9 shows the average number of young fledged from each nest that year (see Note h. for comparison with other study areas).
- Column 10 shows the number of young fledged per pair averaged for all the pairs that laid eggs that year and includes those pairs that abandoned their eggs, lost nests to predation or had infertile eggs. **This is a measure of productivity.**

The nests of 10 pairs were located and monitored in 2017. The first nest of the Round Hill west pair was not found but the adults were seen feeding young post-fledging in an area where the nest was thought to have been located. This and the 12 nests that were monitored have been used to determine annual productivity.

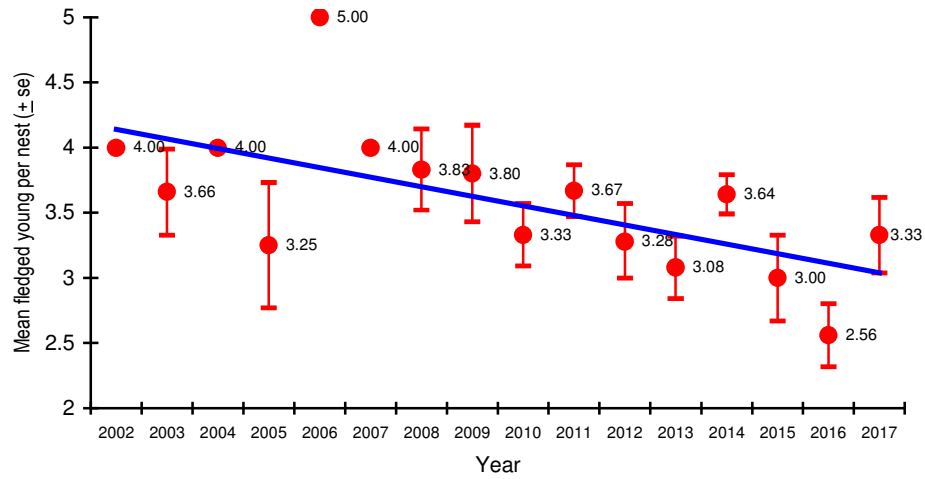


Figure 1: Annual mean fledged young per successful nest for Rosedale and other areas of the North York Moors between 2002 and 2017 showing 16-year trend.

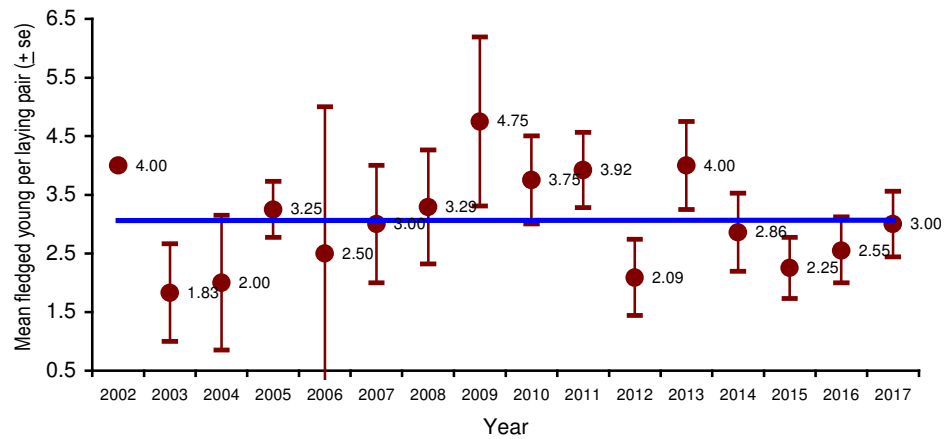


Figure 2: Annual mean fledged young per laying pair for Rosedale and other areas of the North York Moors between 2002 and 2017 showing 16-year trend.

4.4 First-egg Laying Dates

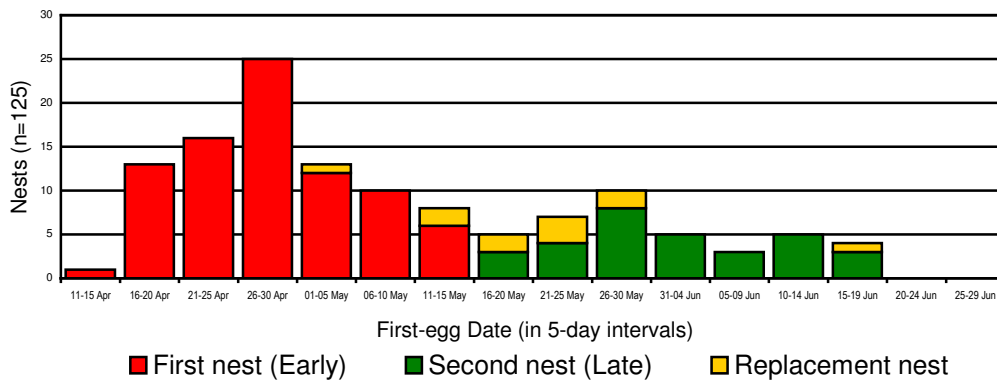


Figure 3: First-egg laying dates for Rosedale and other areas of the North York Moors between 2000 and 2017. Date points in 5-day intervals from April to June. (n=125)

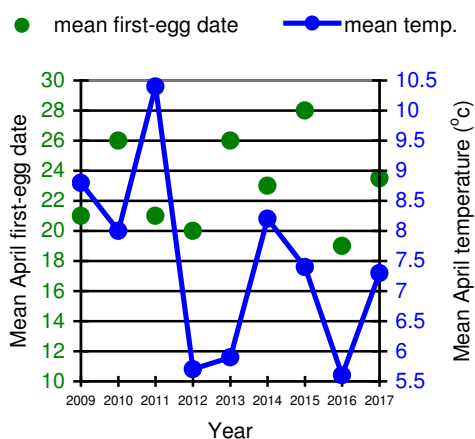


Figure 4: Mean April first-egg date and temperature for the North York Moors for the nine-year period from 2009 to 2017. (data from Fig. 6)

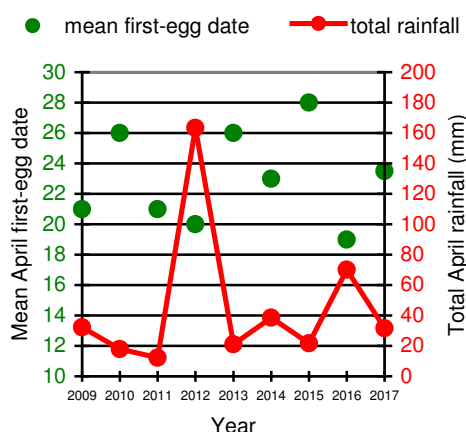


Figure 5: Mean April first-egg date and total April rainfall for the North York Moors for the nine-year period from 2009 to 2017. (data from Fig. 6)

4.5 First-egg, Hatching & Fledging Dates

Table 4: First-egg, hatching & fledging dates for Rosedale and other areas of the North York Moors.

Year	Nest location	1 st Egg	Hatching	Fledging	Comments
2000	Spaunton Moor	6 May (a)	21 May (a)	3 June	
2002	Bank Top	17 May	1 June	15 June	Replacement nest/eggs.
2004	Matty Carr Hill	26 April	11 May	25 May	
	Hob Crag	10 June (a)	26 June (p)	-	2 nd nest.
2006	Ousegill Bridge	10 May	25 May	7 June	
	Sheriff's Pit south	21 May	5 June	18 June	Replacement nest/eggs.
2007	Round Hill south	5 May (a)	20 May (a)	2 June (a)	
	Hob Crag	5 May (p)	-	-	
	Reeking Gill west	26 April	11 May	24 May	
	Dalehead west	29 April	14 May	27 May	
2008	Sturdy Bank 1 st	29 April	14 May (a)	27 May (a)	
	Sturdy Bank 2 nd	10 June	25 June (a)	9 July (a)	1 st egg 14 days after 1 st nest fledged.
	Round Hill south	1 May	16 May (a)	29 May	
	Reeking Gill	5 May	20 May (a)	2 June	
	West Gill	25 April	10 May	23 May	Seen copulating on 22 April.
	Hob Crag 1 st	28 April	13 May (p)	-	
	Hob Crag 2 nd	27 May (p)	-	-	Replacement nest/eggs.
	Sheriff's Pit	7 May	22 May	4 June	
	Dalehead north	25 May	9 June (a) (p)	-	Likely replacement nest/eggs.
2009	Reeking Gill	16 April	1 May	14 May	Pair arrived in gill on 25 March.
	Sturdy Bank	13 May (a)	29 May (a)	11 June (a)	Pair arrived in gill on 26 March.
	Round Hill south	26 April	11 May	24 May	1 st nest. 2 nd nest at Sheriff's Pit.
	Dalehead west	10 May	25 May	8 June	Likely to be 1 st nest.
	Sheriff's Pit	26 May	10 June	23 June (a)	2 nd nest. 1 st nest at Round Hill south.
2010	Sturdy Bank 1 st	30 April (a)	16 May (a)	29 May (a)	1 st nest.
	Sturdy Bank 2 nd	16 June (p)	-	-	Predated at egg stage.
	Reeking Gill	16 April	1 May	14 May (a)	1 st nest.
	Reeking Gill cut. 1 st	9 May	24 May (a)	6 June	1 st nest.
	Reeking Gill cut. 2 nd	11 June	26 June	7 July	2 nd nest. Likely fledged at 11 days.
	Ousegill 1 st	28 April	13 May (a)	26 May	1 st nest.
	Ousegill 2 nd	2 June	17 June (a)	-	2 nd nest. Failed at chick stage.
	Hob Crag 1 st	29 April	14 May	28 May (a)	1 st nest. Fledged at 14 days.
	Hob Crag 2 nd	9 June	24 June	7 July	2 nd nest
	Sheriff's Pit	13 May	28 May	10 June	Likely to be 1 st nest.
	Round Hill central	27 April	12 May	25 May	1 st nest.
	Dalehead quarry west	22 May	6 June	19 June	Likely to be 2 nd nest.

Year	Nest location	1 st Egg	Hatching	Fledging	Comments
2011	Hob Crag	19 April	4 May	17 May	1 st nest. In nest on 16th ready to fledge.
	Round Hill east	18 April	3 May	17 May	1 st nest. In nest on 16th ready to fledge.
	Round Hill west	10 May	25 May	7 June	1 st nest. In nest on 6th ready to fledge.
	Matty Carr	17 April	2 May (a)	16 May	1 st nest. In nest 14. Fledged & by nest 16.
	Sturdy Bank 1 st	21 April	6 May (a)	19 May (a)	1 st nest.
	Sturdy Bank 2 nd	28 May	12 June (a) (p)	-	2 nd nest. 3 hatched on 12th. Predated.
	Nab Scar north 1 st	21 April	6/7 May (a)	20 May (a)	1 st nest. 2 eggs hatched on 6th & 2 on 7 th
	Nab Scar north 2 nd	26 May	10 June	23 June (a)	2 nd nest. 3 pulli, 1 egg unhatched.
	Reeking Gill 1 st	16 April	1 May	14 May (a)	1 st nest.
	Reeking Gill 2 nd	19 May	3 June (a)	17 June (a)	2 nd nest. 3 eggs hatched on 3rd.
	Ousegill	28 April (a) (p)	-	-	1 st nest. Likely predated at egg stage.
	Dalehead west 1 st	23 April	8 May	21 May	1 st nest.
	Dalehead west 2 nd	29 May	13 June	26 June	2 nd nest. In nest 24/6, out of nest 27 th .
	Dalehead north	8 May	23 May	6 June (a)	1 st nest.
	Dalehead quarry west 1 st	28 April	13 May	27 May (a)	1 st nest.
	Dalehead quarry west 2 nd	?	(p)	-	2 nd nest. Predated at chick stage.
	Dalehead east	25 May (a)	9 June	22 June	Likely to be 2 nd nest.
	Thorgill Bank	18 May	2 June (a) (p)	-	Likely to be 2 nd nest. Predated.
	Sheriff's Pit	30 May	15 June	27 June	Likely to be 2 nd nest.
2012	Reeking Gill cutting	17 April	2 May (a)	16 May (a)	1 st nest. 3 eggs hatched 2/5. 14 days to fledged.
	Sturdy Bank	27 April (a)	-	-	1 st nest. Abandoned at egg stage.
	Nab Scar south	20 April (a)	5 May (a)	19 May (a)	1 st nest. 2 hatched 5 th . 14 days to fledged.
	Dalehead west	-	-	-	1 st nest. Abandoned at egg stage.
	Sheriff's Pit north	21 April	6 May	19 May (a)	1 st nest.
	Sheriff's Pit	28 May	12 June	25 June (a)	2 nd nest.
	Round Hill south	29 April	14 May (a) (p)	-	1 st nest. Predated between Day 5 & 8.
	Reeking Gill	23 April	8 May (a)	22 May (a)	1 st nest. 14 days to fledging.
	Blakey Lion	10 May	25 May (a)	7/8 (a) June	1 st nest. 2 fledged 7/6 & 1 fledged 8/6.
	Matty Carr south	22 May	6 June (p)	-	Likely 2nd nest. Predated between Day 2 & 6.
	Matty Carr quarry	19 June	4 July (p)	-	Likely replacement 2 nd nest from MC south pair. Predated at chick stage between Day 5 & 9.
	Round Hill west	20 May	4 June (a)	17 June	Likely 2nd nest. One pulli died naturally in nest.
	Nab Scar north	(p)	-	-	2 nd nest. Predated at egg stage.
	Spaunton Knowl	22 April	8 May	(o)	1 st nest. 3 pulli. Outcome unknown.
2013	Reeking Gill cutting	-	-	-	1 st nest. 4 eggs laid. Found abandoned 19/5.
	Sheriff's Pit 1.	25 April	10 May	24 May	1 st nest. 2 fledglings seen close to nest on 27/5.
	Sheriff's Pit 2.	3 June	19 June	1 July	2 nd nest. 3 possibly Day 6 stage on 24/6. 1 near nest 8/7.
	Reeking Gill 1.	27 April	12 May (a)	25 May	1 st nest. 3 hatched 12 th & 1 on 13 th . Likely fledged 25 th .
	Reeking Gill 2.	28 May	12 June	24 June	2 nd nest. 2 pulli 21/6 9/10 days. Fledged 24/6 12/13 days. 1 egg unhatched.
	Reeking Gill south 1.	2 May	17 May	30 May	1 st nest. 2 pulli at Day 6 on 22/5. 2 eggs unhatched.
	Reeking Gill south 2.	5 June	20 June	3 July	2 nd nest. 4 pulli on 21/6 at Day 2 stage.
	Hob Crag quarry 2.	25/26 April (p)	-	-	2 nd nest, 1 st clutch, predated at egg stage.
	Hob Crag quarry 3.	5 May	20 May (a)	2 June (a)	3 rd nest, 2 nd clutch. 3 hatched 20/5. 2 pulli in nest on 1/6.
	Hob Crag quarry 4	12 June	25 June	7 July	4 th nest, 3 rd clutch. Day 3 27/6. Likely fledged at 12 days.
	Dalehead west	28 April	13 May (a)	26 May	1 st nest. 1 hatched, 3 eggs on 13 th .
	Round Hill west	14 May	29 May	11 June (a)	Likely late 1 st nest. 4 pulli fledged 11/6.
	Round Hill south 1	2 May	17 May	31 May	1 st nest. Possibly 14 days to fledging.
	Round Hill south 2.	16 June	1 July (a)	13 July (a)	2 nd nest. Fledged at 12 days. One dead left in nest.
	Blakey Lion north	3 May	18 May	30 May	1 st Nest. Likely to have fledged at 12 days.
	Sturdy Bank	2 May	17 May	30 May	1 st nest. Day old fledgling found in nest area on 31/5.
	Blakey Lion south	12 May	27 June	9 June	Likely late 1 st nest. Day old fledgling found on 10/6.
	Hob Crag north 1.	15 May	30 May	12 June	Likely late 1 st nest. Day old fledgling found on 13/6.
	Hob Crag north 2.	19 June	4 July (a) (p)	-	Late 2 nd nest. 3 eggs on 27/6. Day 1 on 4/7. Predated.
2014	Round Hill west	16 April	1 May	15 May	1 st nest. 4 eggs laid, 3 pulli seen at Day 11. Likely fledged 15/5.
	Round Hill west	30 May	14 June	(p)	2 nd nest. 4 pulli seen at Day 6 on 19/6. Found predated on 23/6.
	Round Hill east	27 April	12 May (a)	25 May	1 st nest. 4 eggs, 3 newly hatched & 1 egg on 12/5. All 4 fledged 25/5.
	Blakey Lion south	27 April	12 May (a)	25 May	1 st nest. 4 eggs laid, 3 newly hatched & 1 egg on 12/5. All 4 fledged 25/5.
	Hob Crag quarry	18 April	4 May (p)	-	1 st nest. 4 pulli at Day 2 on 5/5. Found predated on 12/5.
	Thorgill Bank quarry	19 April	5 May (p)	-	1 st nest. 2 eggs 1 pullus just hatched 5/5. Found predated on 12/5.
	Thorgill Head	14 May	29 May (p)	-	Replacement nest. Sitting on 2/6. Found predated 5/6 at 3 days. 1 egg left.
	Matty Carr quarry	1 May	16 May	28 May	1 st nest. 4 eggs. 4 pulli Day 4 19/5. 3 seen on 26/5. Likely fledged 12 days.
	Sheriff's Pit	4 May	19 May	30 May	1 st nest. 4 eggs. 4 seen 29/5 11 days. Nest empty & 2 dead near nest 30/5.
	Sheriff's Pit	8 June	23 June	06 July (a)	2 nd nest. 3 pulli seen in nest on 30/6 at Day 8.
	Spindle Thorn	25 April	10 May	23 May (a)	1 st nest. 4 pulli seen at Day 11 on 20/5. In nest on 22/5 out of nest on 23/5.
	Reeking Gill west	(p)	-	-	1 st nest. 4 eggs on 30/4. Found predated at egg stage.
	Reeking Gill quarry	(p)	-	-	1 st nest. 4 eggs on 30/4. Found predated at egg stage.
	Reeking Gill south	24 April	9 May	20 May (a)	1 st nest. 4 eggs laid. 4 days old on 13/5. Fledged at 11 days.
	Reeking Gill	2 June	17 June (a)	29 June	2 nd nest. 2 pulli & 2 eggs 17/6. 3 pulli seen in nest 28/6. 1 dead in nest.
	Nab Scar south	15 May (p)	-	-	Replacement nest. Predated at egg stage.
	Farndale - Breckon Bank	19 April	5 May (a)	18 May (a)	1 st nest. 2 eggs & 2 newly hatched on 5/5. 2 fledglings close to nest on 18/5.
	Farndale - High Blakey Moor	25 April	10 May	22 May (a)	1 st nest. 4 eggs laid, 4 pulli at Day 6 on 15/5. Fledged at 12 days.
	Esklets -Esklets Crags south	26 April	11 May	(o)	1 st nest. 4 eggs laid, 4 pulli at Day 5 on 15/5. Not checked after 15/5.
	Esklets -Esklets Crags north	26 April	11 May	(o)	1 st nest. 4 eggs laid, 4 pulli at Day 5 on 15/5. Not checked after 15/5.

Year	Nest location	1 st Egg	Hatching	Fledging	Comments
2015	Blakey Lion south	(p)	(p)	(p)	1 st nest. 3 eggs. Found predated 27/4.
	Round Hill east	26 April (a)	12 May (p)	-	1 st nest. 4 eggs. 3 newly hatched & 1 egg on 12/5. Found predated 20/5.
	Round Hill west	-	-	25 May	1 st nest. Adults feeding chicks in nest 22/5. Juveniles seen near nest 26/5.
	Hob Crag quarry	(p)	-	-	1 st nest. 4 eggs. Found predated 20/5.
	Hob Crag north	(p)	-	-	1 st nest. 4 eggs. Found predated 20/5.
	Thorgill Bank quarry	8 May (a) (p)	-	-	1 st nest. 4 eggs. 1 egg 8/5, 4 eggs 12/5. Found predated 22/5.
	Thorgill Bank west	20 May	6 June	19 June (a)	Replacement nest for Thorgill Bank quarry pair. 4 pulli ringed 14/6.
	Sheriff's Pit	29 April	14 May	27 May	1 st nest. 3 pulli close to fledging 26/5.
	Reeking Gill	29 April	14 May	26 May	1 st nest. 4 eggs on 11/5. 1 pullus & no eggs on 20/5. 1 pullus ringed 22/5.
	Reeking Gill	31 May	15 June (a)	29 June	2 nd nest. 4 eggs on 9/6. 1 pullus just hatched & 3 eggs. 4 pulli ringed 23/6.
	Nab Scar north	30 April	15 May	27 May	1 st nest. 3 eggs on 11/5. 2 pulli & no egg on 20/5. 2 pulli ringed 22/5.
	Bank Top	28 April (a)	12 May (p)	-	1 st nest. 4 eggs. Found predated 20/5.
	Bank Top	23 May	7 June	19 June (a)	Replacement nest. Found 16/6, 3 pulli 9 days old. 3 pulli ringed 17/6.
	Spindle Thorn	11 May	26 May	8 June	1 st nest. 4 eggs. 4 newly hatched pulli 26/5. 4 pulli ringed 2/6.
	Bank Top east	6 May	21 May	4 June	1 st nest. Adults feeding fledglings 9/6 & 16/6. Likely 5 days out of nest on 9/6.
2016	Bank Top	(p)	-	-	1 st nest. 4 eggs 22/4. Found predated 1/5.
	Thorgill Bank quarry	8 May	23 May	3 June	1 st nest. 4 eggs 10/5, 13/5, 17/5. 1 pullus ringed 29/5.
	Sheriff's Pit	22 April	7 May	20 May	1 st nest. 3 pulli seen 17/5.
	Sheriff's Pit	31 May	15 June	28 June	2 nd nest. 3 pulli seen 21/6, 24/6.
	Round Hill east	15 April	30 April (p)	-	1 st nest. 4 pulli seen 3/5 estimated 3 days old. Found predated 8/5.
	Matty Carr quarry	(p)	-	-	1 st nest. 4 eggs 6/5, 8/5. Found predated 13/5.
2017	Sturdy Bank	25 April (p)	-	-	1 st nest. 2 eggs 26/4. Found predated 29/4.
	Hob Crag north	30 April	15 May	27 May	1 st nest. 4 eggs 2/5. 4 pulli 16/5 est. 1 day old.
	Sheriff's Pit north 1	20 April	5 May (p)	-	1 st nest. 4 pulli seen 6/5 estimated 1 day old. Found predated 13/5.
	Sheriff's Pit north 2	27 May	11 June	23 June	Replacement nest. 4 pulli 20/6 est. 9 days old.
	Thorgill Bank east	2 May	17 May	30 May	1 st nest. 4 eggs 9/5. 4 pulli 23/5 est. 6 days old.
	Matty Carr west	21 April	6 May	18 May (a)	1 st nest. 4 pulli 13/5 est. 8 days old. Fledged: 2 on 18/5 & 2 on 19/5.
	Loskey Side	12 June	27 June	9 July (a)	2 nd nest. 4 eggs 19/6 & 21/6. 4 pulli 29/6 est. 2 days old.
	Round Hill west	19 June	4 July	17 July	2 nd nest. 3 eggs 24/6. 1 pullus & 2 eggs 4/7. 2 pulli on 14/7.
	Dalehead west	29 April	14 May	27 May	1 st nest. 3 pulli 22/5 est. 8 days old. Food taken to nest 26/5. Nest empty 30/5.
	Reeking Gill	20 May	5 June	-	Likely replacement nest. 5 eggs 3/6. 5 pulli 7/6 est. 2 days old. Found dead 9/6.
	Hob Crag west	20 June	-	-	2 nd nest. 4 eggs. Found nest destroyed on 27/6 with eggs crushed.
	Farndale east – High Blakey	26 April	11 May	24 May	1 st nest. 4 eggs seen 1/5. 2 pulli est. 9 days old seen on 20/5.
(a) = actual (o) = outcome unknown (p) = predated/abandoned					
Dates other than actual are based on a 29-day breeding cycle assuming female commences sitting on 3 rd egg and both incubation and chick stage take 13 days.					

4.6 Distance Between First & Second Nests

The distance between first and second nests is shown below in Table 5. Most built their second nest close to the first. The exception to this was the 2009 pair that moved more than half a kilometre to build their second nest - the female's distinct white head marking easily identified the pair. Studies by Appleyard in the Yorkshire Dales record a mean distance between first, second and third brood nests of **64** metres with a median of **55** metres (n=26). For the North York Moors the mean and median values are **94** metres and **62** metres respectively (n=29).

Table 5: Distance between 1st and 2nd nests in Rosedale and other areas of the North York Moors.

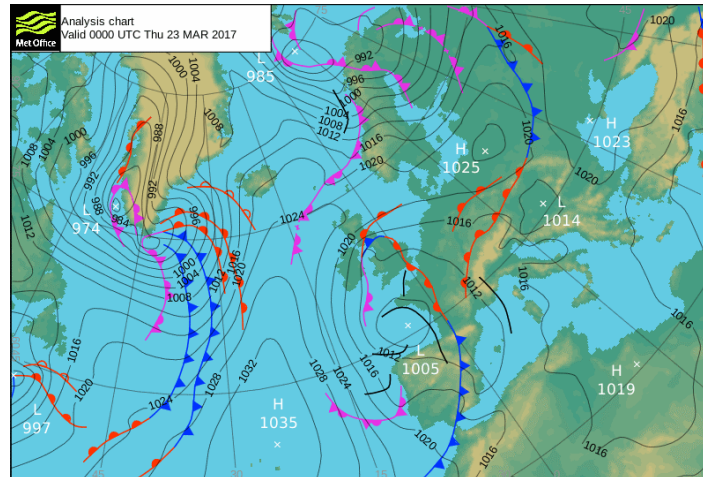
Year	Location	National Grid Reference		Distance (metres)	Comment
		First nest	Second nest		
2003	Thorgill Bank	SE7072195811	SE7073895808	17	
2005	Sheriff's Pit	SE6972196263	SE6972296271	8	
2006	Sheriffs Pit/Sheriff's Pit south	SE6972296268	SE6978496106	173	1 st nest - Sheriff's Pit 2 nd nest - Sheriff's Pit south
2008	Hob Crag	SE7144295395	SE7138795446	75	2 nd is replacement nest
2008	Sturdy Bank	SE6989499907	SE6986599899	30	
2009	Round Hill south/Sheriff's Pit	SE6953396742	SE6972596266	513	1 st nest - Round Hill south. 2 nd nest - Sheriff's Pit.
2010	Bransdale, Ousegill	SE6399795110	SE6397994971	140	
2010	Hob Crag	SE7138195441	SE7131895441	0	First nest was reused.
2010	Sturdy Bank	NZ6988800004	NZ6987000054	53	
2010	Reeking Gill cutting	NZ6879000661	NZ6885600683	69	
2011	Reeking Gill	NZ6915200719	NZ6916800713	17	
2011	Dalehead west	NZ6792700814	NZ6793700793	23	
2011	Sturdy Bank	NZ6986900050	SE6986899936	114	
2011	Dalehead quarry west	NZ6829600847	NZ6829600847	0	2 nd nest on top of 1 st nest.
2011	Nab Scar north	SE6945099957	NZ6943800004	48	
2012	Sheriff's Pit north/Sheriff's Pit	SE6967796429	SE6972596266	168	2 nd nest as used in 2011.
2013	Hob Crag quarry	SE7144095390	SE7137095430	83	1 st & 2 nd fledged nests.
2013	Hob Crag quarry	SE7138095420	SE7144095390	67	Predated & 1 st fledged nests.
2013	Sheriff's Pit	SE6972096260	SE6971996260	1	
2013	Reeking Gill	NZ6924000790	NZ6950000830	256	
2013	Reeking Gill south	NZ6929000430	NZ6933000450	39	
2013	Round Hill south	SE6968096710	SE6959096700	98	
2014	Round Hill west	SE6926197061	SE6923897087	32	
2014	Sheriff's Pit	SE6979696247	SE6972696269	70	
2015	Bank Top	SE7179594969	SE7055395721	172	1 st predated, 2 nd fledged.
2015	Reeking Gill	NZ6924500793	NZ6913500649	181	1 st & 2 nd fledged.
2015	Thorgill Bank quarry/west	SE7074195824	SE7055395721	215	1 st predated, 2 nd fledged.
2016	Sheriff's Pit	SE6973096260	SE6971996260	3	1 st & 2 nd fledged nests.
2017	Sheriff's Pit north	SE6966596455	SE6970596425	57	1 st predated, 2 nd fledged.
Mean Distance				93.9	metres
Median Distance				62.0	metres

5. DISCUSSION

5.1 Climate

5.1.1 Local Weather Observations

March: After an unsettled period just ahead of the first-arrival in Rosedale, an area of high pressure became established over the British Isles during the last week of the month bringing more settled conditions with light winds and long sunny periods during the day but with cold nights that saw temperatures close to freezing.



April: The settled conditions continued through the first week of the month. Day time temperatures were in the double figures most days. Very little rain fell during the first week and most days saw periods of sun making for a very Spring like feel. The mild conditions were noted in the early blossom seen on trees with some fruit trees seeing blossom a month earlier than expected. Anticyclonic conditions became established over much of the country during the second week that saw day time temperatures well into double figures with an unseasonal high on the 9th of 20^oc. Very little rain was recorded during the first half of the month. Towards the end of the month a strong flow of northerly air brought cold windy conditions with rain most days. Night time temperatures dropped to freezing and snow fall over-night on the 25/26th that covered the higher grounds to a depth of 3 cm. By the last few days of the month temperatures recovered and Spring returned.

May: An unseasonable flow of cold northerly winds brought near Arctic conditions during the first week of the month and a temporary halt to Spring. Day time temperatures struggled into double figures though cloud cover meant that night time temperatures remained well above freezing. Very little rain fell during this period resulting in the National Park Authority placing *Extreme Fire Risk* warning signs on moorland roads. By the 14th of the month the dry period had ended with 12mm of rain falling over the next four days. Night time temperatures remained high with a number of evenings staying above 10c. Westerly winds replaced the cold easterly air flow that had dominated the early part of the month. The closing days of the month saw settled conditions return with day time temperatures in the low to mid 20s in the final week and little rainfall, making the month one of the driest.

June: The first week of June saw unsettled conditions return as low pressure to the west of the country resulted in several days of heavy rain fall, with over 79mm falling between the 3rd and 8th. Strong winds were encountered over the period, with gusts of 45mph on the 6th. By the middle of the month it was all change as an area of high pressure established itself over much of the country. Day time temperatures were in the mid to high 20s and seldom lower than 15c by night, with temperatures on the 18,19 & 20th topping 27c. In the south of the country daytime temperature reached 34.5c, the highest June temperature since 1976, making the month one of the hottest in 40 years. The closing days of the month saw unsettled conditions return as a low pressure system became established over the north sea bringing stormy conditions over the 27th and 28th. Temperatures by night were back into single figures and day-time highs struggled to reach 15c in a strong northerly air flow. Over the last few days, rainfall exceeded 13mm, most falling on the 28th, with June proving to be the wettest month of the year with over 112mm.

It is suspected that the persistent heavy rain which fell during the first week in June was the cause of the nest being abandoned at Reeking Gill. The 45mph winds and almost 8cm of rain which fell in a few days would have made it extremely difficult for the adults to feed themselves and five newly hatched chicks. This, and the adults absence from the nest during these food expeditions, would have undoubtedly exposed the near naked chicks to the cold wet conditions that caused them to chill.

July: The unsettled conditions continued throughout July with most days seeing rain. Widespread thunderstorms on the evening of the 6th saw over 29mm of rainfall recorded at the Westerdale weather station. Temperatures made a slow recovery with daytime highs in the low 20s by the end of the first week. The second half saw a drop in temperatures with mid-day values often in the mid teens.

Graphs of temperature and rainfall for the months April to June 2017 recorded at Westerdale, North York Moors, are shown at Annex 5. Figure 6 below charts the mean temperature and total rainfall for the month of April for the years 2009 to 2017 at Westerdale, while Figure 7 charts the regional mean temperatures and rainfall for the years 2001 to 2017.

The Westerdale weather station is about 180 metres a.s.l. near the village of Westerdale (NZ6605) on the North York Moors and is approximately five km north-west of Rosedale dalehead.

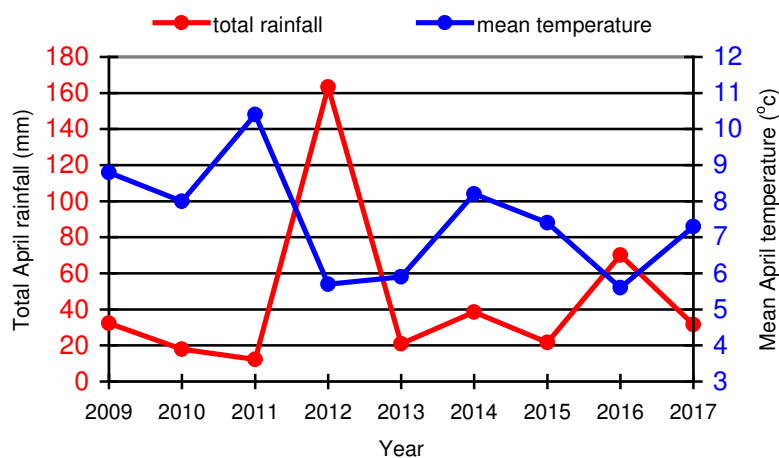


Figure 6: Mean temperature and total rainfall for the month of April recorded at Westerdale, North York Moors, between 2009 and 2017.

5.1.2 Regional Values

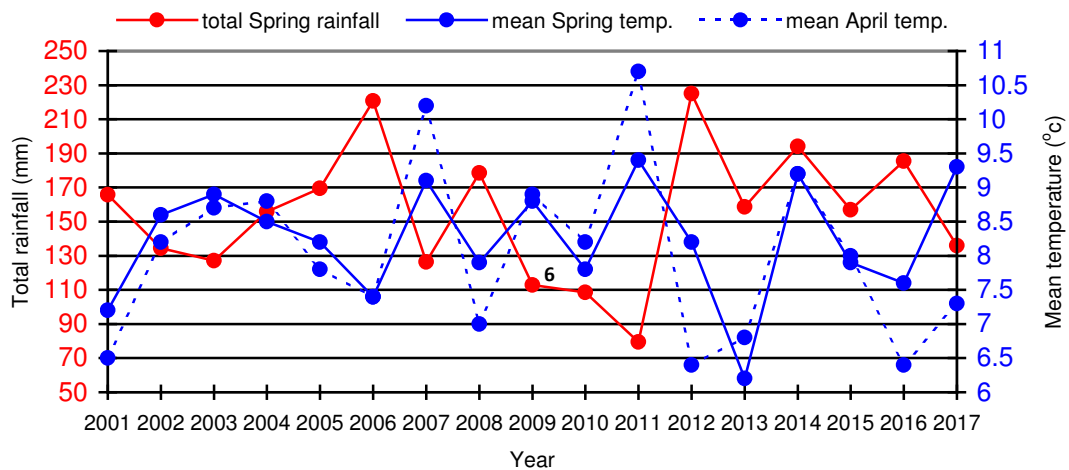


Figure 7: Spring and April mean temperatures and total rainfall between 2001 and 2017. (Data for Met Office North-East England Region. Spring = March, April, May)

5.2 First Arrivals

Rosedale was monitored for first arrivals from the beginning of the second half of March. The first Ring Ouzel to be recorded in the dale in 2017 was a single male at the head of the dale on **22nd March**; just a day later than the previous first arrival date in 2012 and 2014. By the **24th March** there were sightings on the west side of the dale of males at Sledge Shoe and Round Hill south. On **26th March** a male was seen at Spindle Thorn by the side of the road, while on **28th March** a male was heard singing in the quarry at Hob Crag. The first female of the year was seen at Reeking Gill on **30th March**.

By **4th April** several favoured territories had males present, including: Sledge Shoe, Round Hill west, Round Hill east and at the disused pit shaft at Sherrif's Pit; where a male was seen leaving the shaft and joining a female a little north of the pit. By **17th April** singing was heard in several places on the west side of the dale and pairing had begun with pairs seen at Sledge Shoe and Round Hill south. The first nest of the season was found on **26th April** at Sturdy Bank on the east side of the dale with two eggs.

Elsewhere on the North York Moors there was a sighting of a male Ring Ouzel at Bonfield Ghyll on the west side of Bransdale on **25th March**.

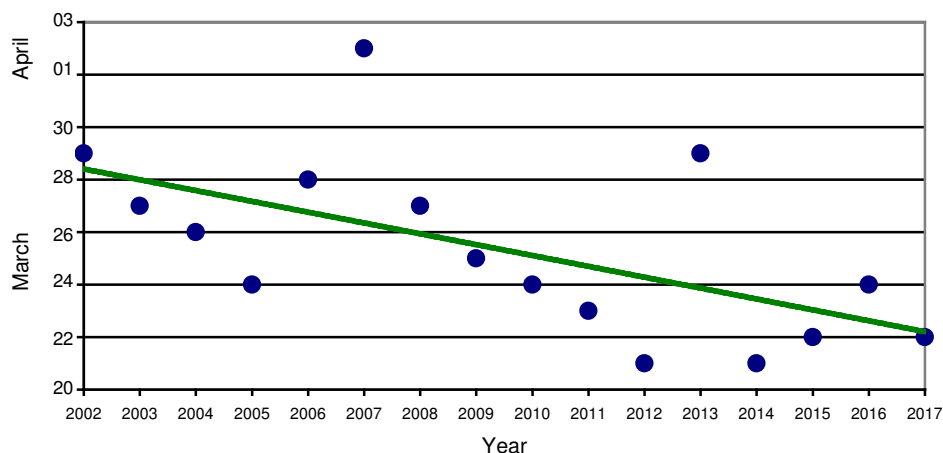


Figure 8: First-arrival date and 16-year trend for the Rosedale area of the North York Moors for the period 2002 to 2017.

5.3 Rosedale Territories and Nests

Seventeen Ring Ouzel territories were recorded in 2017 in the Rosedale area of the North York Moors; four more than 2016 and reversing a worryingly downward trend since the peak year of 2012 when 23 territories were recorded. Most territories had been occupied before; though one high on the moors at Hob Crag west was the first that had been recorded in that area. The discovery of a nest at Loskey Side ford on Spaunton Moor was a first in this area. Only one other sighting had been recorded here when in 2014 a fledgling was seen being fed by adults close to the ford.

As in 2016 an unexplained situation was the low number of territories recorded on the east side of Rosedale. For several years the north-east side of the dale was a much-favoured breeding area with the Reeking Gill area having the highest breeding density in the dale – typically 3 pairs/km² against an average of 0.47 pairs/km² for the Rosedale area in general. The reason for the move from the east side of the dale to the west in the last two years is unclear.

In all, 44 distinct territories have been recorded in the Rosedale area between 1999-2017 (see Table 1). The location of the 2017 territories is shown at **Annex 1**.

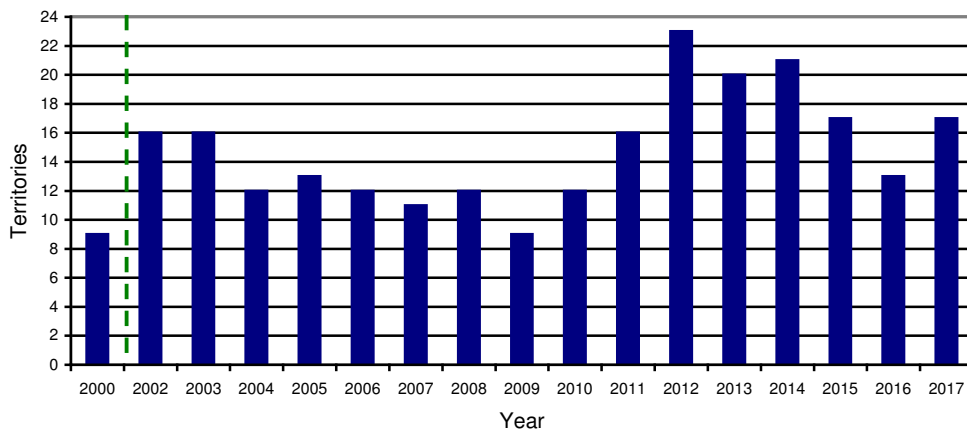


Figure 9: Confirmed & Probable territories recorded in the Rosedale area of the North York Moors between 2000 and 2017. (foot & mouth prevented field work in 2001)

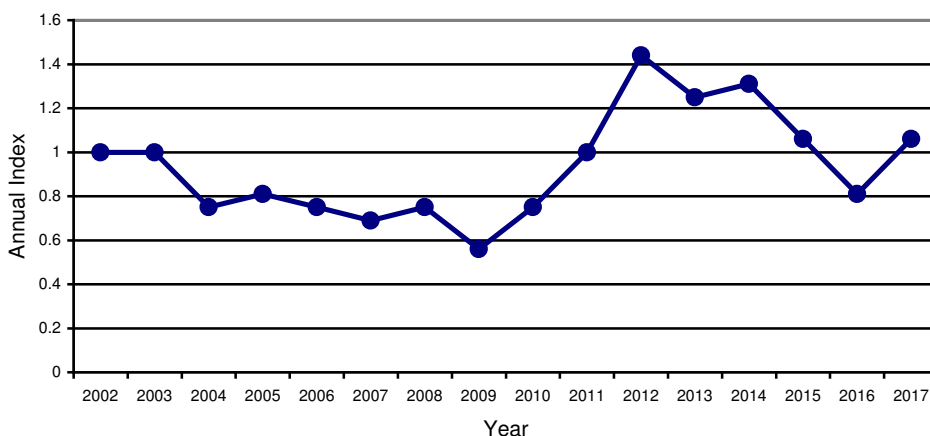


Figure 10: Annual indices of Confirmed & Probable territories recorded in the Rosedale area of the North York Moors between 2002 and 2017 referenced to 2002.

5.3.1 Bank Top

The first sighting in the Bank Top area was on **11th April** when four males were seen foraging at the bottom of the incline. Their behaviour suggested they were most likely passage migrants, the incline being a regular stopping off place in the past for Fennoscandia birds.

On **30th April** a pair were seen half way down the incline foraging in the gullies on the moorside of the incline. A cold search of the area on **2nd May** found no evidence of a nest.

A visit to the incline area on **9th May** located four males and one female part way down the incline. One male was observed cocking its tail to the female in an apparent courting attempt. What was thought to be two pairs were later seen flying west beyond the kilns before being lost from sight. At the same time a male was seen singing in a tree part way down the incline while an unseen male was heard singing nearby.

On **23rd May** the moor under-keeper reported a male singing from a tree near the cottages at Bank Top on a number of evenings towards the end of May. The presence of pairs in this area, and the singing that was noted throughout the month, suggests there may well have been one territory in the Bank Top area and an early breeding attempt, though no hard evidence was obtained as to where the nest could have been located; as noted in the past, Ring Ouzels can be elusive birds. Three previous nests in this area in past years have been found on the moor plateau several hundred metres west of the kilns, with the tree near the cottages being used then as a song post.

5.3.2 Blakey Lion

Although reports were received of a probable Ring Ouzel in between the two footpath signposts on **12 April** and of a male ouzel in the nearby garden on **23 May** sadly there were no other indications to suggest presence of a territory here in 2017.

5.3.3 Dalehead quarry

On **30 March** a flock of six Magpies were in an altercation with two Kestrels at the south end. As the quarry was approached and these dispersed two ouzels came in to sight. One flew high and south towards Reeking Gill, the other back towards the north end and out of view. The latter may have been the Dalehead West bird.

On **4 May** shortly after a Kestrel was seen to drive a Buzzard away across the dale just south of the Quarry there was a brief glimpse of an ouzel flying into a nearby gully. When he did not reappear the area was approached and a male flushed out with much chacking into a nearby tree. A cold search of possible nest sites revealed nothing apart from a pair of agitated Stonechats. On **22 May** a male sang from this same tree between the quarry and the cutting before flying dale side and out of sight.

5.3.4 Dalehead north & west

Dalehead West was the location of the first Ring Ouzel sighting in Rosedale in 2017. It was a cold morning on **22 March** with overnight snow still lying at the head of the dale. Attention had been drawn to a Stonechat alarm call when a black bird was glimpsed flying low down towards two small trees at Dalehead. It was quickly identified as a male ouzel flitting between the trees before being lost to view. He was then briefly relocated feeding on the south side of the embankment. The first encounter of the year is always a great sight and it was almost missed.

North of the embankment at Dalehead on **30 March** an ouzel flew from the west side in an arc, over the embankment on the east side, across the dale and settled in one of two small trees near Dalehead West. As the location was approached it flew south on the east side and landed on the low wall before dropping out of view. Nearby at a small embankment pond two newts were found with small flesh wounds and barely alive. It appeared that our approach had disturbed their predator which may well have been the departing ouzel.

On **20 April** a male ouzel was located on the nearest shooting screen beyond the northern embankment. He preened for ten minutes and then chacked and flew over to feed on the dale side embankment. He had been watched intently for another ten minutes in the hope that a female might appear when another male appeared from cover. This prompted no territorial

behaviour as they fed quietly together. On the return journey later in the afternoon a male was flushed from the trackside just south of Dalehead West and again after a few minutes, he was suddenly joined by a second male. Were these passage birds?

On **28 April** a pair was located feeding in the grassy areas low down just above the river hidden in the trees. They stayed within a few metres of each other feeding steadily. At one point they were both in view along with a male Redstart. When disturbed by two walkers they flew about 50 metres to another grassy patch. The walkers continued on and settled at Dalehead for a picnic which was frustrating. The ouzels continued to feed at a distance for another 30 minutes until observation was terminated by the arrival of the shepherd to gather in the last stragglers for lambing.

On return later in the afternoon two ouzels flew from north of the embankment over to the south side. It was thought that there may have been a third bird which again raised the possibility of passage birds. As Dalehead West was reached it was encouraging to see a male perched on top of the ridge close to the very first nest sites here. This was the behaviour more associated with being on sentry duty rather than the passage feeding and loitering of the other two birds.

A pair was watched feeding on the embankment for an hour on **4 May** but any chance of watching the female back to her nest was ended by the presence of two surveyors working for the Ordnance Survey.

On **22 May** a male observed feeding on the embankment at Dalehead was watched from a distance for over an hour in the hope that he might be joined by the female. During this time he flew briefly down to the rushy area near the wall and then back again. Eventually he flew south along the top of the quarry. He was later relocated on the quarry floor at the south end where a second male appeared and began to feed. There was no interaction.

It was decided to move on to Dalehead West where a female ouzel suddenly appeared. Cover was taken as a male also arrived, both were carrying food. Not knowing how close the nest was there was an anxious wait to see whether they would approach the nest. The female was very cautious but eventually popped into heather high up close to the summit of the bank. As there were walkers approaching from both directions it was decided to postpone visiting the nest. Following a short climb to the top of the ridge in late afternoon a nest containing three chicks probably just over a week old was quickly located.

Both adults were carrying food to the nest on **26 May**. It was a surprise to note that they were both flying across the dale and down to Dalehead Quarry to collect food, perhaps a sign of the dry conditions nearby on the embankment. Later in the afternoon when the Dalehead Quarry was visited the pair was again watched as they repeatedly collected food from the quarry floor and returned to the nest at Dalehead West. A male Chaffinch then engaged in some interesting behaviour. He persistently followed close to the male ouzel as he searched for food, even following closely as he gradually moved away to the south end of the quarry.

On Tuesday **30 May** a brief visit to check the nest began with an attack by a very aggressive Red Grouse during the descent to the track. She made three rushes, neck stretched forward, wings spread wide and accompanied by loud hissing sounds. The hen then led the way down to the track as the chicks disappeared safely into cover. The nest only just visible in early morning fog was then watched for about 20 minutes until with no sign of the adults a short climb up the ridge revealed an empty nest. Fledging had been expected on Sunday or Monday but in the poor visibility it was difficult to safely confirm whether the fledglings were nearby.

The male was on the ridge close to the nest on **1 June** and chacking from a hidden ouzel was presumed to be the female. The male flew down to the quarry where they had been collecting food and then returned to the ridge to sing. He was then joined by the female before they were lost to view as a Kestrel chased off a Carrion Crow. Both were still present in late afternoon but further observation for any signs of a potential second nest was disrupted by the steady flow of walkers.

On **13 June** a male was singing from a shooting butt halfway down the dale side just south of Dalehead West and the female chacked away from cover nearby. Later in the day this site was watched from the floor of Dalehead Quarry opposite. A male ouzel made two short visits to the quarry but was not seen to be carrying food. A Peregrine flew over from the west, he was high up and just before he crossed the quarry he folded his wings back as in a stoop as he flashed overhead moor side. A Grey Wagtail made several visits to collect food. After almost an hour of observation an ouzel was finally spotted emerging from cover close to the shooting butt across

the dale. It was somewhat disappointing to find that it was a well grown juvenile probably from the Dalehead West nest and not the female emerging from a second nest.

5.3.5 East Mines

On **11 April** a single male feeding near the track between the kilns chacked away over the top. Still present on the return journey he did exactly the same. Two weeks later on **26 April** a female ouzel feeding on the slope just above the track below the ruins flushed up to the next level and continued to feed. There was again no evidence of breeding here.

5.3.6 Hob Crag north

The first evidence of this territory being used came on **2nd May** when a casual inspection of an old 2015 nest found it to have been refurbished and to contain four eggs. On passing by later in the day a look at the nest site from some 20 metres distance saw the female fly off the nest towards the dale bottom and out of sight.

On **16th May** the female was seen leaving the nest and a quick inspection found four pulli a day old. Later both adults were observed collecting food in the grassy area just below the track and going to the nest. An inspection of the nest on the **23rd May** while the adults were away collecting food, found four well-fed pulli around nine days old.

The nest was checked on **27th May** and found empty, most likely having fledged that morning. Later in the day both adults were seen taking food to different places in the heather some 30 metres from the nest. This was the last date that activity was observed at this site with no evidence after this of the territory being used for a late nesting attempt.

5.3.7 Hob Crag quarry

The first sign of activity here came on **28th March** when a male was heard singing in the quarry. A short while later the male flew out of the quarry joined by a second bird and both landing in the heather on the daleside of the track at Hob Crag north.

On **30th March** a male was seen flying from below the quarry and landing on top of the quarry wall where it chacked softly for the next five minutes or so before flying off westwards and out of sight. At the same time an unsighted bird was heard chacking in the wooded area east of the quarry.

The situation at this site was confused on **11th April** when a large flock of Ring Ouzels was seen in the trees below the quarry with some foraging in the meadow below the intack wall. A short while later some 15+ birds (at least one being a female) were seen flying past the quarry in a northerly direction. Without doubt these were Fennoscandia migrants stopping off to feed, the area being a well-known stop-off for these Spring passage birds.

The first evidence of nesting in the quarry area came on **30th April** when a pair were seen below the main part of the quarry, the female feeding frenziedly in a manner which suggested she had just come of the nest after a long stint of incubating. A short time later the female was seen flying into a rocky area below the quarry closely followed by the male. There was no further sighting of either bird before observation ended some 20 minutes later.

On **2nd May** a cold search of the area where the female was observed going to the previous day found no evidence of a nest. The same day two males were seen some 100 metres east of the quarry, one singing briefly before appearing to chase the other off. Both went on to the moor top at the back of the quarry with one heard singing from an unseen location.

There was further evidence of two resident males in the quarry area on **9th May** when two were seen together foraging around 200 metres east of the quarry below the track. Later in the day a single male was seen singing in the tree above the main part of the quarry and then again 30 metres east of the quarry – good audio recording made. While this bird was being observed a pair were seen foraging below the track in the vicinity of the nest at Hob Crag north.

On **23rd May** a male was observed for over 15 minutes singing loudly from a fence post at the east end of the quarry. Again on **27th May** a male was seen in the same tree singing and then a short while later from a large rock below the quarry. Spectrum analysis of an audio recording of this bird showed it to be a different male to the one recorded on the 9th May suggesting that this male may well have been unattached. Observations in the past point to this being the case when a male in late May is heard singing at volume over a long period of time.

On **6th June** there was a brief sighting of a pair flying into the quarry and then out over the moor top out of view. Later in the day a male (or a mature female?) with a **Yellow** ring was seen 200m east of the quarry. He bobbed in and out of the rushes making his way towards the quarry before then flying into the quarry and out of sight; the lettering on the ring could not be read but the bird would have been one of 18 rung as a nestling in the Rosedale area in 2015 – interestingly, a **Yellow** ringed male was seen just the once in the same area in 2016. On **11th June** at the west end of the quarry a male was seen bobbing in and out of the heather softly tuc-tucing in a manner suggesting there were young nearby. A check of the area found no sign of young. The male returned to the same spot 20 minutes later and chacked before flying into the dalebottom below the quarry where he was briefly heard singing.

There were no further sightings in the quarry area after this date but, despite no evidence of breeding by way of a nest or young, there was strong evidence throughout April and May to suggest that breeding took place somewhere in the quarry area.

5.3.8 Hob Crag west

This was the first time a territory had been recorded at this location. On **20th June** a nest with four eggs was found by the under-keeper adjacent to the track at SE71139530. The nest was built at ground level under a clump of heather. An inspection of the nest on **27th June** found all the eggs had been crushed. There was no evidence as to what had caused the damage, though perhaps significant was the track maintenance work being carried out at that time where large stones had been spread over the track; some of which were found very close to the nest. This or the workmen spreading the stone could have inadvertently trampled the nest that resulted in all four eggs being crushed.

The time-line for activity in the Hob Crag area strongly points to this being a late nest for the pair that nested in the quarry. This pair was thought to have fledged young around 10 days or so before the Hob Crag west nest was found.

5.3.9 Loskey Beck south

On **2nd May** a male was seen singing in a tree alongside Loskey beck, a few 100 metres south of the ford at Penwash. At the same time a second male was seen in a tree at Spindle Thorn. Again on **9th May** two males were seen in almost the same locations at Spindle Thorn and Loskey Beck; at one point both shared the same tree without showing any sign of aggression.

A female was seen on **18th May** foraging on the west side of the moor road some 400 metres north of Spindle Thorn before flying off in a westerly direction towards the Loskey Beck ford at Penwash. A sighting on **19 May** of a Ring Ouzel at Penwash was reported by the moor under-keeper.

On **27 May** a visit was made to Penwash and a lure used. This was done from two locations within the area around Penwash but without a response. A further sighting was made by the head-keeper on **1st June** of three Ring Ouzels feeding in the grassy area part way between Spindle Thorn and Loskey Beck. It was unclear from this report if this was a family group or three adults. This was the last sighting in the area despite further visits during the later part of June.

5.3.10 Loskey Side ford

During a field trip with a group of botanists on **19 June** a lunch stop was made at Loskey Ford. As the party was leaving after about 40 minutes the last couple saw a bird fly from some heather. Returning alone later in the afternoon to conduct a search, a fortunate stumble in the most likely area flushed a female from a nest just off the track. The nest contained four eggs. She had sat remarkably tightly just as she had done earlier in the day where the party had lunched within a few feet of the nest.

A dawn visit on **21 June** the longest day found her still sitting tightly on four eggs. A male was singing from the top of a tree to the south.

On **29 June** the female again sat tightly despite very close attendance, eventually hopping off but remaining in the heather shrub until the nest was approached. She then flew off to reveal a nest containing four two day old chicks. They probably hatched on **27 June** giving a first egg date of **12 June**. Remarkably, since the previous visit on **24 June** a mini digger had been along this track and dug out the ditches and run-offs. The ditch directly under the nest had been excavated, no

more than 1m from the nest and still she had continued her duties. Previous experience at this nest suggests that she probably just sat through it.

The female was not present on arrival during an evening visit on **3 July**. The four sleeping chicks looked well. On walking back through the area a short time later the female was disturbed about 10m from the nest. She flew and settled about 30m away. Two gapes came up for food as the nest was given a final check. The chicks looked about six days old which fitted the original estimate. No male was seen.

All four chicks were still present just before 7am on **7 July**. They now looked nine days old but certainly not ten which previous estimates had indicated. The previous two visits had been evening visits though which may have accounted for the difference. Late in the day visits may be suggesting that they were a day older than they actually were. The male appeared nearby carrying food.

Another early morning visit on **9 July** found that they had fledged, either by accident or intentionally. There was gentle chacking close to the nest on approach and the female flew about 40m away still chacking gently. From the track the nest appeared empty and on moving closer and looking down at the ground a fledgling was tucked into a tuft of rush just off the track and almost below the nest. There were plenty of droppings next to it, purple in colour. Observing from a distance across the ford, the male was heard to sing briefly and then with an occasional chack he appeared in one of the two trees downstream. The female worked her way back to the fledgling and also to some heather 3m away. The male suddenly sang quietly from the tree and then he flew up with much chacking to intercept a kestrel heading over. He ensured the kestrel flew through before returning to his post. The female then appeared from the east side of the beck and hopped her way along the track to visit the same two places. She was a while in the heather and could have visited more than one place there. On leaving the area the fledgling was still in the same place showing some downy feathers on the body as well as the head. It did not look more than 11 days old but the initial assessment indicating now 12 days old may have been correct.

A brief visit mid afternoon on **10 July** found the female chacking from one of two trees downstream. A check of the area visited the previous day by the female revealed four piles of droppings all similar in appearance. It was likely that all four had fledged and then stayed within 4m of the nest that day. They were no longer in view but the female was agitated so the site was vacated.

5.3.11 Matty Carr quarry

The first sighting at this location was on **17th April** when a male and female were seen at the north end of the quarry below the singleton holly tree. Both flew into the dalebottom and out of sight. A short time later a male was heard singing from an unseen location below the quarry. A search of the quarry on **27th April** and **6th May** found no evidence of nesting.

On **13th May** a lure was played at the south end of the quarry and almost immediately a male flew into a nearby tree from the dalebottom closely followed by a female. Both birds were carrying food. A few minutes later the male flew over the top of the quarry towards the moor and out of sight while the female flew back towards the dalebottom. (see 5.3.12)

5.3.12 Matty Carr west

A search of the Matty Carr area on **13th May** where the pair reported in 5.3.11 were seen carrying food to, eventually located a nest in deep heather on the west slope of the disused railway cutting some 100 metres due west of Matty Carr quarry. The nest contained four pulli that were estimated to be seven days old. Inspecting the nest on **18th May** found two pulli very close to fledging. Evidence of droppings close to the nest suggested the other two had left the nest that morning. Both adults were seen in the immediate area with the male taking food to the nest and the female to separate locations just 15 metres or so from the nest on the east of the track. On **30th May** the male was seen singing in a tree at the south end of the quarry. A few minutes later a female joined him for a minute or so before flying off in a northerly direction and out of sight. The male continued singing for another five minutes before flying off out of view. There were no further sightings after this and no evidence of a late nest in the area around the quarry.

5.3.13 Nab Scar

Sadly most sightings here were of passage birds. On **3 April** there were brief glimpses of a male ouzel with a bright gorget, very high up at the north end of Nab Scar North and on **8 April** two ouzels possibly a pair were flushed higher up Nab Scar South before flying with much chacking to feed south of the cairn.

On **11 April** six male ouzels, flushed from below the track settled to feed on the bank between Sturdy Bank and Nab Scar. They continued to move just ahead and finally flew off Nab Scar South, over the track to an area south of the cairn and fed. There was no indication of territorial behaviour. Returning later there were about nine males feeding south of the cairn. On **23 April** there was no activity on the Nab face but 13 ouzels were feeding on the grassy area south of the cairn. They were mostly males but included at least one female. There were still at least nine ouzels feeding quietly south of the cairn on **26 April**. At least two were females. No activity on nab. On **28 April** it was frustrating to find between eight and ten passage ouzels including at least one female still feeding dale side at Nab Scar. Four flew to trees low down on the Scar when disturbed. A solitary male gradually worked his way up towards summit of Nab Scar North. It was hoped that not all were passage birds. On **4 May** an ouzel flew from Nab Scar North towards Reeking Gill. The passage birds seemed to have moved on.

5.3.14 Reeking Gill

On **30 March** a female was located high up on the east side of the gill where she was joined by a male which emerged from heather close by. They were very quiet.

On **8 April** after observing from a stone dale side for about one hour a female suddenly flew out of the gill and landed in the small tree close by. She had chacked out of the gill from somewhere high up and continued to chack all the while in the tree. After about a minute she chacked as she flew back to the gill. Again the sound indicated she was somewhere high up.

As the gill was entered on **20 April** a pair flew down from the north side high above the track and out of view towards the gill quarry area.

The site was approached from the Millennium Stone on **24 April** and all was quiet during a careful check of the area. The old nest at the head of the gill above the waterfall was unaltered. A search was made along the southeast side of the gill, both high up and down into the gill. The old nest sites halfway down and in the bottom were visited but there was no activity and no sign of refurbishment. There was no sign of activity in the traditional feeding areas dale side of the gill. There was no sign of ouzels on the morning of **4 May** but on return from Reeking Gill South a male flushed from close to the track flew up into Reeking Gill Quarry. The area was then watched from just north of the gill and a pair eventually located feeding in the quarry suddenly flew strongly into the wind high up in the gill and out of sight.

A Kestrel was in the gill on **26 May** and in the afternoon an ouzel flushed from the trackside up towards Reeking Gill Quarry and out of sight.

On **1 June** a male ouzel was picked up on a shooting butt high in the gill above the waterfall was a promising sight. It was decided to approach via a climb up through Reeking Gill South where there were groups of agitated Curlews and Lapwings but no ouzels. The vicinity of the shooting butt was approached from the south east side and a patient watch began. After ten minutes a female ouzel flew on to the butt, was startled and chacked away. A male then flew along the North West side of the gill. After a while there was a pleasant surprise with the arrival of two staff from the Land of Iron project on their way to Nab Scar to check heritage sites. This gave one member her first view of an ouzel as we watched both male and female pass up and down the gill. It seemed that the nest was not too far away but just out of view. It was decided to cross the gill to watch from further away. There were no further sightings from the opposite bank and it was suspected that she had returned to the nest unseen during the crossing of the gill. Finally on returning to the shooting butt the female was watched as she worked her way very cautiously back to a nest site in a gully high up on the north east side of the gill. The precise location was out of view and on approach from above the female flushed before the actual site could be pinpointed. In order to avoid any further disturbance final location of the nest was left for another day.

On **3 June** the gill was approached from the Millennium Stone and the watchers settled to observe the nest site from the North West side of the gill. At 1050 there was chacking and the female landed on the shooting butt. She then flew in and landed close to the suspected site and after a brief pause went into heather. It was not clear how far in she went. It was a surprise when she left the nest again after just a short stay at 1102. It was decided to wait and watch. After about 15 minutes there was chacking from the male and it was thought this may indicate that the female was returning but there was no sign of her. Observation continued but at 1150 it was decided that she may have deceived us and the site was approached. As the gill side was descended, the female flushed off the nest and when the site was reached a brief search found the nest containing five eggs. It was unclear how the female had returned to the nest unseen, perhaps approaching from some distance on the ground through the heather. It was noted that this seemed to be a good place to try out a trail camera.

We met on **7 June**, prepared the trail camera gear and walked in to the head of the gill. All was quiet and there was no immediate sign of the adults. We could just discern the nest through the binoculars, but not the contents so we approached with some concern and were delighted to find that the chicks had hatched. The team left the nest site and retreated to set up the camera and carry out the detection test. This initial view included too many rushes so the camera was moved slightly further away and a little higher. This seemed acceptable but the strong wind was creating a lot of movement. Some additional camouflaging with moss and heather was added. The detection test was repeated and the camera started. There was some brief chacking during set up and we left promptly.

The planned visit on **8 June** was postponed until late afternoon for the persistent heavy rain to clear. The moor was water logged with pools lying in every hollow as the site was approached. A quick glance in the nest confirmed that the chicks were still present, the camera SD cards were exchanged, the camera quickly reset and the site vacated. Following a climb up to the shooting butt the nest camera SD card was checked. There were only 12 shots which included dislodged camouflage and the current visit. There was no clear nest footage so the camera was removed from the site. The moor was still water logged during a visit on **9 June** and the nest was approached with some concern. On reflection the chicks had not looked very lively on the previous visit and it was extremely depressing to confirm that all five chicks were dead, lying in a small heap with the smallest at the bottom of the nest.

5.3.15 Reeking Gill south

On **20 April** shortly after Reeking Gill was left a male ouzel flew down from Reeking Gill South to land dale side before flying back towards Reeking Gill. An ouzel was then located sitting on the side of the wall dale side and three more ouzels including one female were feeding nearby. Later during the return journey four ouzels were flushed from this area by approaching cyclists. They seemed to be staying close together and were assumed to be passage birds. The other male was still present just above the track at Reeking Gill South and this was thought to perhaps be a local bird?

Following a climb up to Reeking Gill South on **24 April** a male ouzel flushed from low down on the tops flew south towards the summit of Nab Scar. Following a long period of observation a female flushed from about halfway up the ridge and flew low over the heather, chacking as she went to land in an area near rushes. She was hidden from view and after a brief wait and approach she flushed northwards and out of sight. Promising but more work was needed to confirm a territory here.

On **28 April** a male ouzel feeding by the track flew up to Reeking Gill South. Later an hour long period of observation produced no ouzel contact but on returning to the track a startled male ouzel flew towards the gill. Later watching from just north of the gill he was located sitting on a boulder at the south end of Reeking Gill Quarry.

On **4 May** a male ouzel again flew up moor side from beside the track where he was feeding. Returning later a pair of ouzels was located feeding in the old Pheasant feeding area. A long period of observation then produced no ouzel contact high up at Reeking Gill South. There were six Mistle Thrushes but no ouzel contact during a high level approach to Reeking Gill on **1 June**.

5.3.16 Round Hill south

The first sighting of a Ring Ouzel at this location was on **24th March** when a male with a bright white gorget was observed foraging in the meadow below the crags. There were no further sightings until **17th April** when a male and female were seen together foraging on the moorside of the intake wall above the crags. Again on the **6th May** a male was seen in the meadow below the crags foraging, giving the distinct impression of a bird whiling away time while the female was on eggs.

On **13th May** a pair were again seen foraging in the meadow. After a short time the female flew off towards Round Hill east leaving the male to continue foraging. The female was seen to enter one of the steep sided gullies that run up to the track from the dalebottom. Despite a long period of observation there was no further sighting of the female, suggesting she may have been returning to a nest after feeding in the meadow.

There were no further sightings until **30th May** when a pair was seen collecting food in the meadow. Both were seen making frequent visits to a rocky area below the crags, giving the impression that they were most likely feeding young. At one point a second male appeared in the meadow but was quickly chased off. Both were seen flying northwards with one in pursuit of the other. The pursuing male was seen to abandon the chase and return to the meadow, the other male eventually looping back to a tree at Round Hill east where it then sang loudly for a few minutes giving the impression that this was most likely an unattached male.

On **6th June** a male was seen feeding a juvenile on the moorside of the intake wall above the crags. At one point the juvenile was observed begging food off the male. The male later dropped into the meadow leaving the juvenile on a fence post where it stayed for a short time before dropping into the grassy area below the post where it was then lost from view. There was a further sighting on **14th June** of a male and a juvenile in the meadow below the crags. There were no further sightings after this date and no evidence of a late breeding attempt.

5.3.17 Round Hill west

The first sighting at this location was on **4th April** when a cyclist reported seeing three males close to the track. Later an unseen bird was heard singing in the dalebottom and then chacking. There was no further sighting until **13th May** when a female was seen foraging by the track at the north end of the cutting. She was seen to fly off into the dalebottom beyond the intake wall where she was then seen foraging; this observation was the first sighting of a Ring Ouzel feeding in the improved pastures below the intake wall. Returning later in the day a female was flushed from a gully running up from the track to the moor-top. A brief cold search of the area where she flew from found no evidence of a nest.

On **23 May** a pair were seen feeding juveniles below the track around 50 metres or so from the gully where the nest was thought to have been. The adults were seen going into the heather with food in three separate places and at one point a juvenile was seen in the open being fed by the male. The male was heard singing softly as he went about his duty, an observation noted before when the male is teaching the young the local dialect. On **30th May** the pair were seen feeding two juveniles in the same area where they were seen on the 23rd. Later in the day the male was seen singing from atop a heather clump alongside the track at the same time an unseen bird was heard singing from the direction of Sledge Shoe.

There was no further sighting until **14th June** when the female was seen in the grassy area where the young had been seen the previous month. At the same time the male was seen singing from a rock outcrop situated just below the track. A short time later the female joined him when the male was then seen bowing and shaking his wings in the manner of a courtship display. On **24th June** a nest containing three eggs was located at the north end of the cutting on the moorside of the track; the female was seen returning to the nest a short while later. A quick inspection on **4th July**, while the female was off the nest, found one newly hatched chick and two eggs. On **8th July** two pulli were seen around four days old and one un-hatched egg. Later the female was observed taking food to the nest. On **14th July** two pulli were seen but no sign of the third egg; one pullus looking underdeveloped. The female was observed close by carrying food. A look at the nest on **16th July** found just one pullus looking underdeveloped and not the estimated 12 days old it should have been. There was no sign of the second pullus which was thought to have fledged that morning. The female was seen going to the nest with food but there was no clear evidence of a fledgling being fed nearby. The last look at the nest was on **17th July** when it was

found to be empty. There was no sign of the female. It was assumed that both had fledged; one on the 15/16th the other on the 17th.

Of interest with this late nest was the absence of a male. Several visits were made to the area around the nest in late June and July but at no time was the male seen; all the rearing of the chicks being done by the female. Given there were just two chicks it is just possible the male considered himself to be surplus to requirement and his services not required so left it all to the female and decided to leave the area; or it could just be that he succumbed to old age or was predated.

5.3.18 Sheriff's Pit north

The first sighting was on **4th April** when a male was seen flying out of the pit shaft northwards up the dale and out of sight. Later that day when passing a male and female were seen together close to the shaft, both flew off high over the moor top. There was a further sighting on **11th April** of a male perched on top of the security fence around the shaft. A few minutes later he dropped to the ground just outside the fence and foraged before being lost from view amongst an area of rushes on the north side of the fence.

On **27th April** a pair were seen close to the pit shaft feeding, the female frenziedly as though she had just come off a nest. After 10 minutes she flew 100 metres north of the shaft and dropped into an area of deep heather. Took a look at the area around 45 minutes later and located a nest containing four eggs. A further inspection of the nest on **6th May** found four recently hatched pulli estimated to be no more than a day old. Both adults were seen nearby with food. Taking a look on **13th May** found the nest empty, assumed predated. Later that day the pair was seen close to the pit shaft then flying north and out of view.

On **23rd May** both birds were seen just south of the shaft, the female looking as though she was prospecting for a suitable nest site along a heather bank on the edge of a moor burn, the male just following her around. A short time later both flew into the shaft and almost immediately came out flying north and out of sight. There was no further sighting until **6th June** when a male was seen singing from atop of a clump of heather very close to the first nest site. On **20th June** a pair was seen part way down the daleside on the opposite side of the track to where the first nest was located. Both were seen to be collecting food. Watched them over the next 30 minutes taking food to a patch of low heather just below the track. Approached the area and found a nest at ground level containing four pulli estimated to be nine days old. On **24th June** the nest was found empty with evidence of droppings close by. A short while later a male and possibly a female were seen flying off the moor some 50 metres north of the nest and dropping to the ground some 200 metres down the daleside below the nest site. There were no further sightings after this of either adults or young and the nest was recorded as a successful outcome.

5.3.19 Sledge Shoe

On **24th March** an un-sexed Ring Ouzel was seen close to the track just north of Sledge Shoe. The bird was seen to fly up the dale and out of view. The next sighting was on **4th April** when a male was seen foraging on the moorside of the track at the southern end of the Sledge Shoe territory. On **17th April** a male and female were seen together in the dale bottom at Middle Ridge, the female having the whiter gorget of a mature bird. Further visits to the area on **27th April** and **6th and 13th May** found no evidence of a resident pair, despite a lure being played on the 6th. On **30th May** a juvenile was seen flying from the track into the dalebottom at the north end of Sledge Shoe. A little later the bird was seen flying high over the moor towards Round Hill west. Later a lure was played at the north end of the Sledge Shoe territory. Within seconds a male appeared in a tree in the dalebottom chacking then singing before flying off northwards out of sight. On **14th June** a male was seen at the north end of Sledge Shoe flying from the track side into the dalebottom and out of sight. Later in the day a male was seen just daleside of the track near the public footpath. A brief snatch of song was heard before flying into the dalebottom and out of sight. Later two males and one juvenile were seen together on a rock part way down the daleside; the male and juvenile both appearing out of the dense bracken below the rock with the juvenile pursuing the male. At one point the males were seen having a spat before one of the males and a juvenile (could have been a different juvenile to the earlier one) flew off towards Round Hill west and out of sight. The most likely scenario for this behaviour was that this was a territory edge dispute between Sledge Shoe and Round Hill west. On **4th July** a male was seen

chacking at the south end of the Sledge Shoe territory. Later the male flew off towards Round Hill west closely followed by a second bird that was thought to have been a juvenile. There were no further sightings at Sledge Shoe after this.

5.3.20 Sturdy Bank

On **8 April** there were brief glimpses of a pair of ouzels high up near the top of the gill. Two Magpies were on the bank overlooking the track.

All was very quiet on arrival on **11 April** but as the bridleway was climbed on the northeast side a pair flew in from somewhere near the plantation. They landed on a heather shrub half way up by the bridleway with much chacking from the female.

On **23 April** all was quiet again as the area was scanned. After a few minutes a very faint chacking was heard from within gill. Finally a female with a very dark gorget was located just below a small holly shrub on the northwest side halfway up the gill. She was on the wet shale and flew in to scant heather at the near side of the holly. She was then observed nest building. First taking in a piece of dry bracken, a few visits with smaller pieces like bent grass and two visits to the beck just below nest area where she collected wet moss. She was certainly not at the nest lining stage. She was heard to chack quietly during all this activity. The male ouzel flew across the gill and perched on heather above the nest site on lip of the gill then disappeared to southeast side. Faint singing was heard intermittently. It was decided not to approach the nest at this stage and on returning later in the day the female flew from the nest site to opposite side of the gill where she fed undisturbed.

It is interesting to note that the last nest discovered at Sturdy Bank was in 2012 and at exactly same site as this one and it was on exactly the same date, **23 April** when the female first started building nest!! That female was assessed as very nervous and the nest which was very exposed to the elements was abandoned at the egg stage.

A cold north wind and wintery conditions continued on **26 April**. The male was eventually found feeding on the grassy area near gullies north of the bridleway whilst the female was feeding on the grass area at the top of the slope above track towards Nab Scar. With both adults well away the opportunity was taken to visit the nest site. The nest was complete, well tucked in to heather with a decent amount of cover and contained two eggs. The ground up to nest site on the slope was very soft and easily gave way.

The nest entrance appeared to be from the south east as this was more open and a camera covering this angle would perhaps see a predator at the nest but it is the most difficult angle to cover with a camera as it is down the slope. As the site was left the male and female hadn't moved from their feeding.

Eleven Magpies between East Mines and Nab Scar were not a welcome sight.

All was quiet when observation began from the embankment just in the gill on the southeast side on **29 April**. A Magpie came through on the tops and three gulls sauntered over. After an increasingly anxious hour the nest site was visited due to suspicions that all was not well. The nest was empty and no signs of disturbance detected. The first nest of the season is also the first to be predated.

Nest building was first seen on **23 April** and two eggs had been laid on **26 April** with both male and female seen feeding in the gill. First egg date was likely to have been **25 April**. It is not known whether the clutch was completed or if the female started sitting. There was no ouzel contact on **4 May** when a Blackbird was halfway up the gill and a Magpie was up to no good.

5.3.21 Thorgill Bank east

On **9th May** while walking down a narrow gully towards Thorgill Bank quarry a female was flushed off a nest containing four eggs. The nest was in a heather bank on the east side of the gully that lead from the track into the dalebottom some 200 metres east of the quarry. This was the first time that breeding had been recorded in this area and was thus a new territory. The nest was approached on **16th May** but no inspection was made as the female was seen sitting tight on the nest. On **23rd May** the nest was checked and four pulli were seen that looked to be around six days old; no adults were seen on this occasion. A further inspection of the nest was made on the **27th May** and four healthy looking pulli were seen. Again as on the previous inspection there was no sign of the adults. On **30th May** the nest was found empty and a fledgling was discovered just two metres from the nest. A further search located the male on a clump of heather around 20

metres from the nest carrying food. Indications suggested the chicks had fledged that morning. There were no further sightings after 30th May in this area.

5.3.22 Thorgill Bank west

On 11th April a male was seen in a singleton tree some 300 metres west of the old sheepfold then flying off towards the quarry and out of sight. A male was seen on the cairn below the quarry on 2nd May. After five minutes it dropped to the ground below the cairn and out of sight. A cold search of the quarry found no evidence of a nest. The various gullies between the quarry and the sheepfold were then searched but with no evidence of a nest.

On 6th June a male was heard singing from an unseen location above the quarry. A short time later a male was seen flying from the quarry area (assumed the one heard singing earlier) over the sheepfold heading westwards and out of sight. Later a brief snatch of song was heard coming from this direction. Later in the day a pair were seen by the track just west of the sheepfold. Both flew off towards the dalebottom and out of sight. A short while later the male was seen perched on the heather close to the track singing. The impression was that there was a nest in the area around the sheepfold. On 14th June, while observing from the sheepfold, there was a brief sighting of a male on the cairn below the quarry. The bird dropped to the ground and was not seen again.

A further sighting was made on 4th July when a female was seen chacking some 50 metres west of the sheepfold. She was seen going into the heather in several places and gave the impression she was feeding young. The area was approached and the female located deep in the heather. She flew out followed by another bird that was thought to be a juvenile. The location she was found contained a good crop of bilberry and was most likely what she was feeding on. There were no further sightings after 4th July.

Analysis of the time-line for Thorgill Bank west and east territories suggests that the pair that had an early nest at Thorgill Bank east was most likely the same pair that had a late nest at Thorgill Bank west.

5.4 Breeding Productivity

Two early nests were found predated, accounting for 28% of the first nests located and monitored in 2017. Two nests, Sturdy Bank and Sheriff's Pit north, were predated at the egg and pulli stage respectively. These early failures are reflected in the below average figure for productivity shown in Figure 11 where the mean number of fledged young per laying pair is 3.00 compared with a 16-year mean of 3.10. This is the fifth year since 2012 that below average productivity has been recorded.

Most Ring Ouzels will attempt a replacement nest if the first fails, though this may not be for a week or more later. As a consequence it may be well into June before the young from this nest fledge - assuming all goes well and the replacement nest is not predated. For most birds this would make it too late in the season to start a late second nest, with the breeding season ending for most Ring Ouzels around the first week or so in July. In effect, for those birds that had their first nest predated, they would have run-out of time and the breeding season for them would be over with at best just one successful clutch to show for the season.

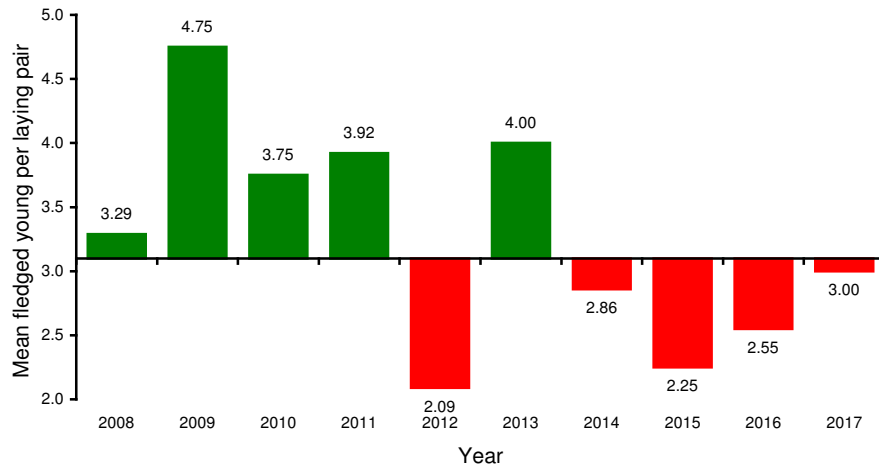


Figure 11: Mean fledged young per laying pair for Rosedale and other areas of the North York Moors between 2008 and 2017 relative to 16-year mean of 3.10

Figures 12 and 13 below show the annual hatching and fledging success for first and second nests. Hatching success looks at all the eggs laid and the percentage of these that hatched. Similarly, fledging success looks at all the eggs laid and the percentage of these that hatched and successfully fledged. A value of 1.0 would indicate 100% success whereas 0.5 would indicate 50% success - that is only half of all the eggs laid hatched or fledged. In 2017 84% of 1st (early) nest eggs hatched with just over two thirds, 68%, fledging. Of the 2nd (late) nests monitored, three quarters, 75%, of eggs laid hatched with just half, 50%, successfully fledging.

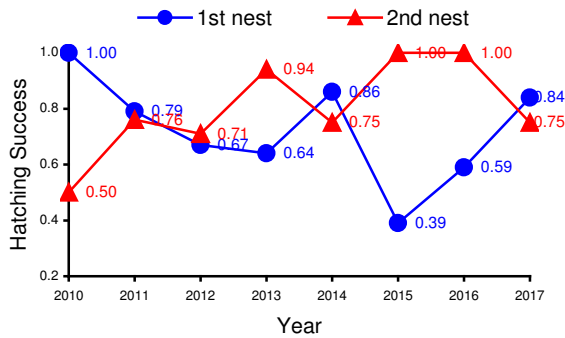


Figure 12: Annual first and second nest hatching success for the Rosedale area of the North York Moors between 2010-2017. Data from Annex 3, Table 1, for known and likely values.

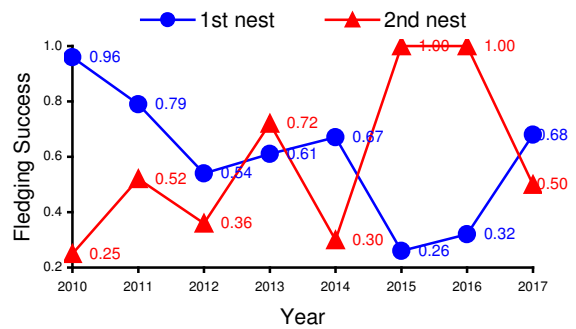


Figure 13: Annual first and second nest fledging success for the Rosedale area of the North York Moors between 2010-2017. Data from Annex 3, Table 1, for known and likely values.

5.5 Late:Early Territory Occupancy

Most bird publications describe the Ring Ouzel as usually being a double brooded species. As not all pairs will have a second nest and fledge a further clutch, one of the concerns is what impact this has on population numbers. For a short lived species, three years for the average Ring Ouzel would be a good age, having a second brood may be important in sustaining or expanding the population.

The method used to determine early and late occupancy was to divide the number of territories that were occupied by pairs after late May (late territories) by the number occupied before late May (early territories) - see Annex 5. The graph at Figure 14 below shows the ratio of late to early occupancy between 2008 and 2017 relative to 10-year mean of 0.56; suggesting just over half, 56 %, of Rosedale birds have on average a second nest. Also to note is the below average occupancy of the last four years shown by the red dots.

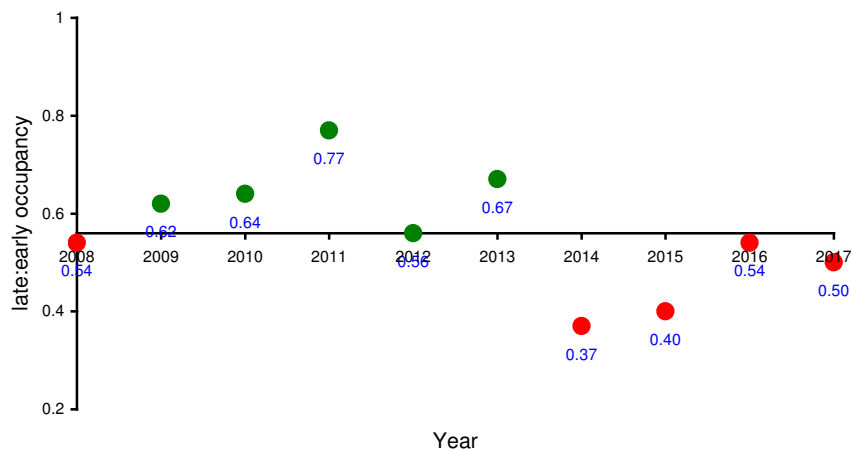


Figure 14: Annual ratio of late to early territory occupancy for the Rosedale area of the North York Moors between 2008-2017 relative to 10-year mean of 0.56

5.6 Nest Aspect

The aspect of a nest is the compass bearing that the nest entrance faces and is the direction the adult birds are seen to use most to enter or exit the nest. It is likely that the topography has a strong influence on nest aspect in Rosedale. The main dale runs NW to SE and on the east side, where it might be expected that more nests would face west, the two main offshoot gills of Reeking Gill and Sturdy Bank and the quarry at Dalehead seem to present fewer opportunities for nests to face this direction. Likewise, on the west side of the dale the quarries at Matty Carr and Hob Crag predominantly face east as do the heather banks at Blakey Lion, Dalehead west and Round Hill east and south. Only at Round Hill west where the disused railway cutting has ideal heather banks for nesting, with a choice of either east or west facing aspects, do Ring Ouzels prefer the side of the cutting facing east. At Sheriff's Pit where the four sides of the shaft entrance are aligned either NE, NW, SW or SE, the preferred aspect is either SE or NE; though this has probably more to do with the suitability of the shaft sides for nesting. The graph at Fig.15 for all nests in the Rosedale area (data from 1999 to 2017) clearly shows a strong bias to an easterly bearing, with the north-east quadrant being the predominant aspect. For reasons that can't be explained, the south-west quadrant seems to be equally as prominent as the north-east quadrant for second nests - see Fig. 16 and 17. However, what is clear from all three graphs is that few nests are built with an aspect in the north-west quadrant. Whether this is a deliberate move by Rosedale Ring Ouzels or not is uncertain and is an area of study that needs further work.

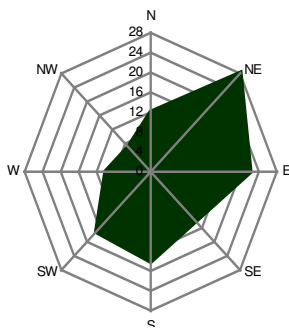


Figure 15: Nest aspect of all nests in the Rosedale area.
Data from Annex 4, Table 1. n=128

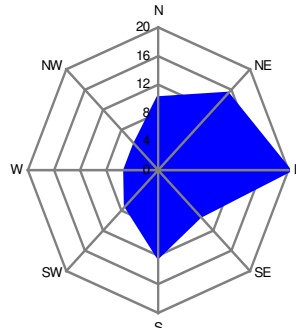


Figure 16: Nest aspect of first nests in the Rosedale area.
Data from Annex 4, Table 1. n=83

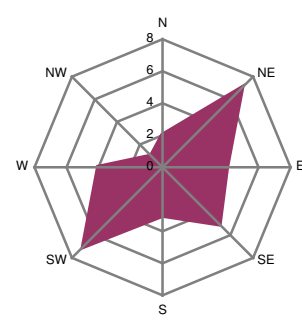


Figure 17: Nest aspect of second nests in the Rosedale area.
Data from Annex 4, Table 1. n=33

In Figures 15 to 17 above the intercardinal points NNE, ENE etc. are not shown. This is done to smooth the graphs and remove the spikes that would be generated if all 16 points were displayed. For each of the eight intercardinal points shown in Annex 4, Table 1, the value (the number of nests with that aspect) is halved and apportioned to each adjacent cardinal point. For example, if the number of nests having an intercardinal aspect of NNE was four, then two would be added to the N cardinal value and two to the NE cardinal value. If the ENE aspect had three nests, then one would be added to NE and one to E. None of the intercardinal points recording just one nest are counted.

5.7 Nest Elevation

Due to the low-lying nature of the terrain, most Ring Ouzel territories in the North York Moors are confined to a narrow altitudinal band lying between the 250 and 400 metre contours. The highest point on the North York Moors lies at 454 metres on Urra Moor and in Rosedale just over 400 metres at Rosedale Head. In the Rosedale area the lowest nest was found at Loskey Beck at 218 metres and the highest above Reeking Gill at 392 metres; with the mean and median altitude being 324 and 331 metres respectively. Around 70% of nests were found in a 50 metre band between the 300 and 350 metre contour. The restricted altitudinal band for breeding Ring Ouzels points to climate change being a potential problem in the coming years for the North York Moors population. Figure 18 shows the elevation of 147 nests recorded in the Rosedale area of the North York Moors between 1999 and 2017.

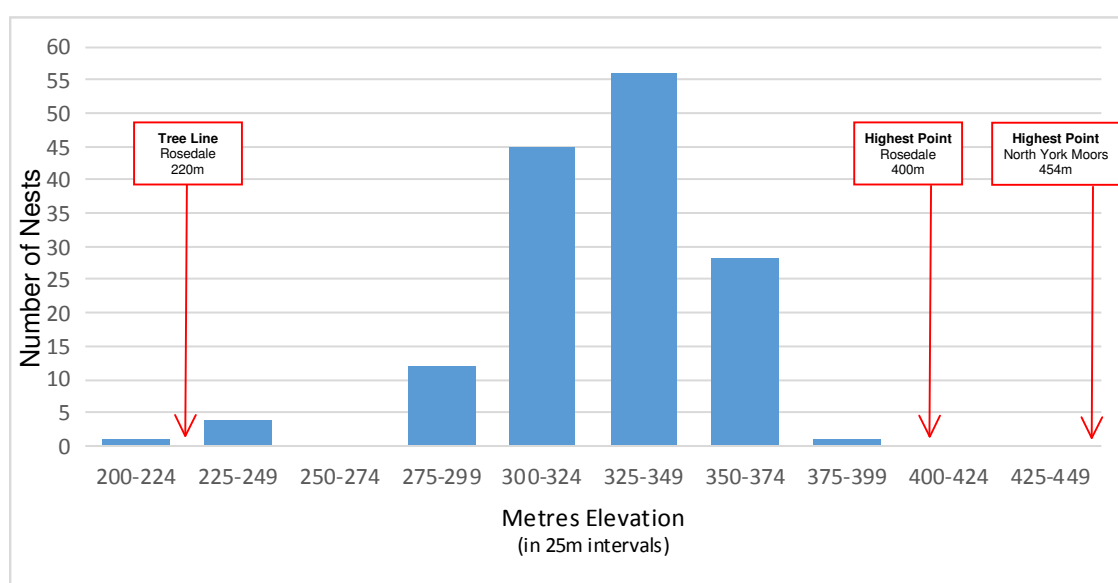


Figure 18: Elevation above mean sea level of nests recorded in the Rosedale area of the North York Moors between 1999 and 2017. Data from Annex 4, Table 1. n=147

5.8 Spring Passage Migrants

Fennoscandia Ring Ouzels on passage are seen most years in Rosedale during April. These birds stop off to feed for a few days before commencing their onward journey to Scandinavia. On **11th April** 15+ males and one female were seen in the Hob Crag area on the west side of Rosedale, some feeding in the meadow just south of the quarry the others in the trees adjacent to the meadow. The birds seen at Hob Crag appeared restless and settled to feed just for a few minutes before flying off a short distance up the dale before dropping to the ground again to feed. The same day nine males were seen on the east side of the dale at Nab Scar and four on the west side at Bank Top. On **23rd April** 13 mostly male Ring Ouzels (one female positively identified) were seen feeding in the Nab Scar area.

5.9 Late Summer Activity

Just one end of season visit was made to Rosedale in 2017. On **21st August** a Ring Ouzel was seen at Dalehead west close to this year's nest site. There were no further sightings on this occasion.

6. ACKNOWLEDGEMENTS

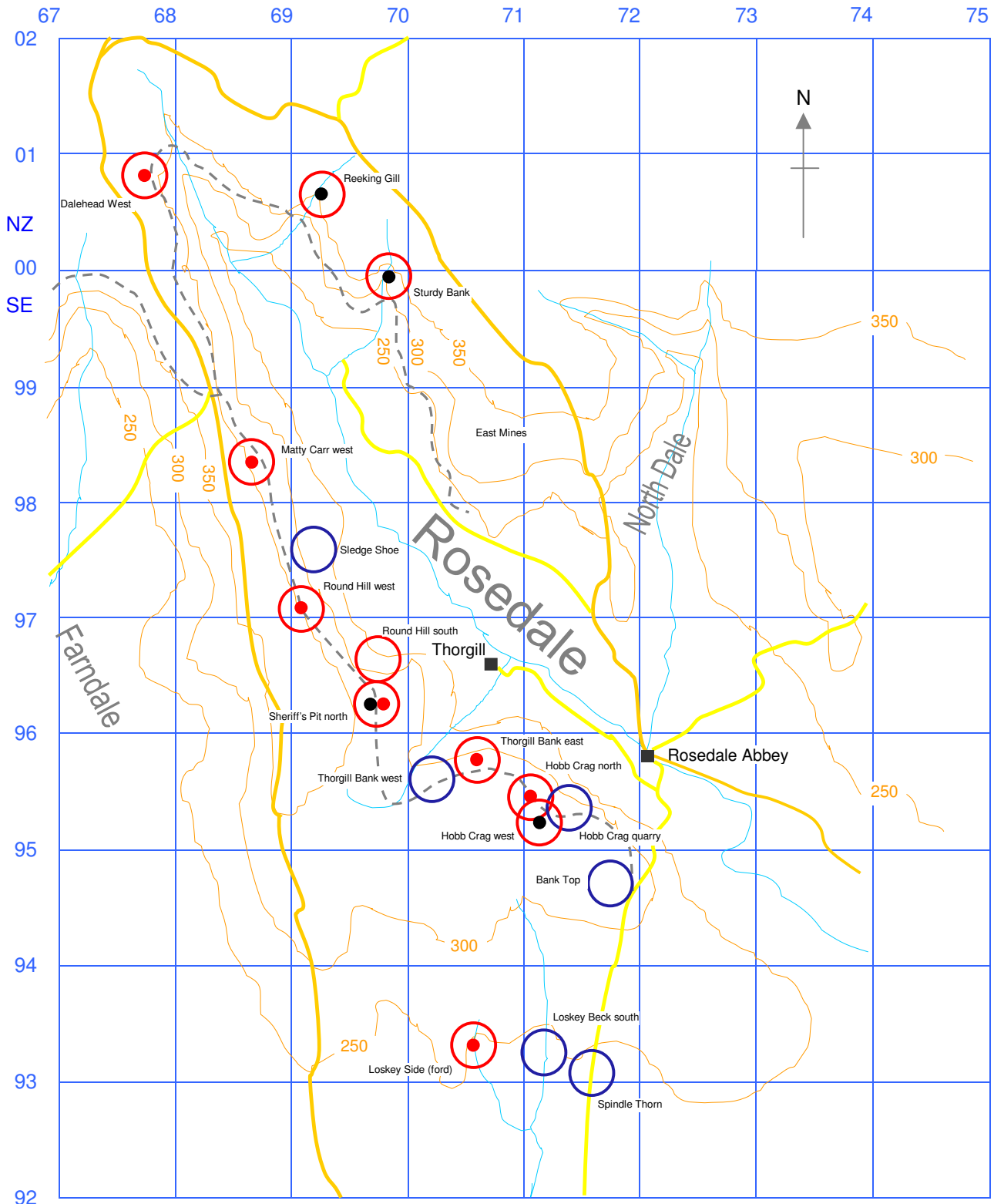
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7. REFERENCES

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ANNEX 1 - Map of Nest Sites and Territories in the Rosedale Area in 2017



Ring ouzel nest sites and territories located in 2017 in the Rosedale area of the North York Moors.

Nest Site		KEY		Territory	
Successful	●	Territory Confirmed	○	Territory Probable	○
Predated or Abandoned	●				

**ANNEX 2 - Map of Sightings on the North York Moors in 2017
(Other than the Rosedale area & passage migrants)**

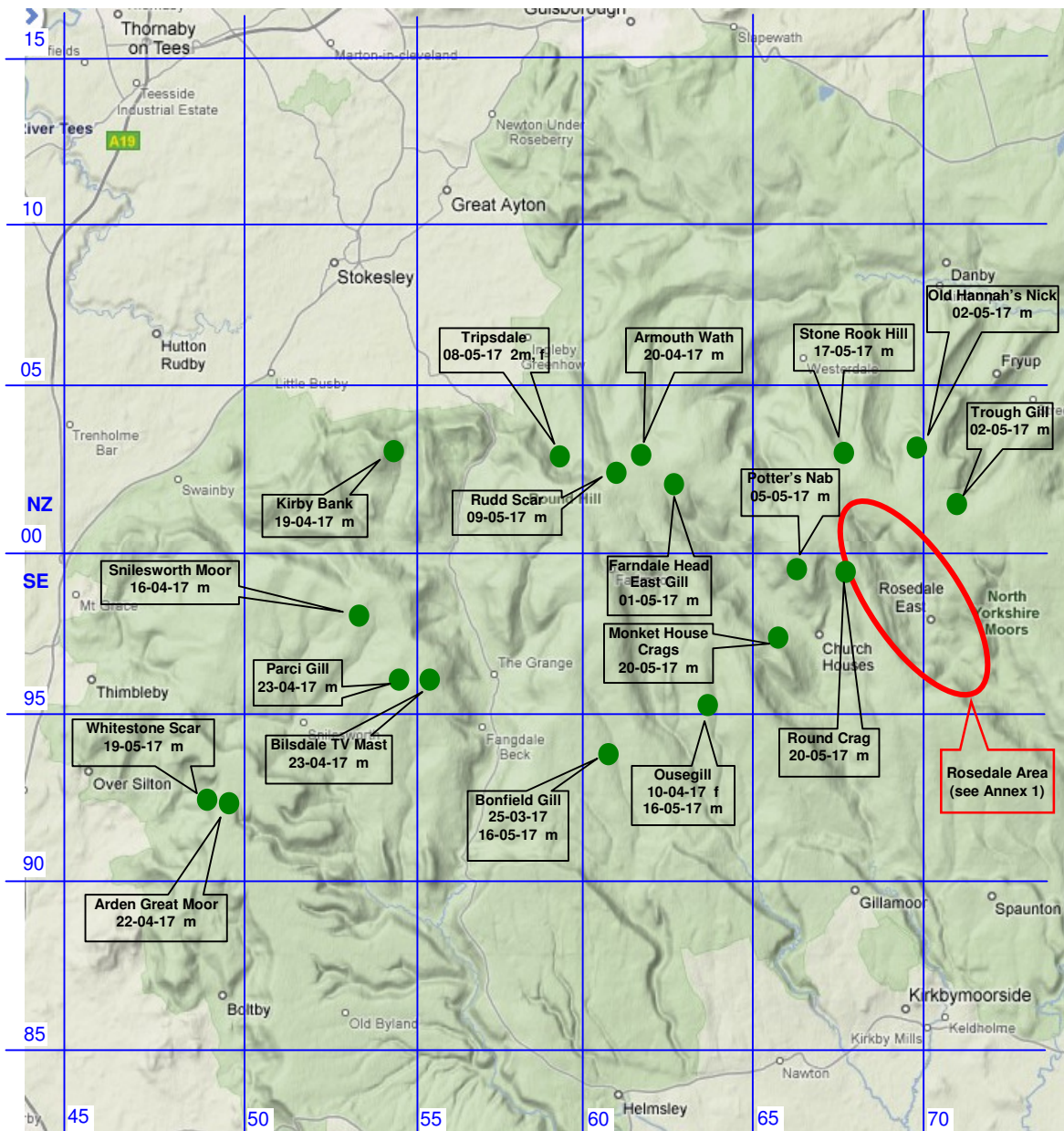


Diagram 1: Sightings of Ring Ouzels on the North York Moors in 2017 other than the Rosedale area and passage migrants.

ANNEX 3 - Table of Annual Breeding Results from 2000 to 2017

Table 1: Annual breeding results at Ring Ouzel nest sites in the Rosedale and other areas of the North York Moors. Data from 2000 to 2017.

Year	Site	Grid Ref.	Eggs	Hatched	Fledged	Comments
2000	Spaunton Moor - Pen Wash	SE71479347	4	4	4	1 st brood. 4 pulli ringed.
2002	Bank Top	SE72049483	(4)	4	4	Likely to be 2 nd brood.
2003	Ouzegill Bdg.	SE63709450	4	4	4	1 st brood. 4 pulli ringed.
2003	Round Hill	SE69279710	4	4	4	1 st brood
2003	Thorgill Head	SE69999559	4	3	0	1 st brood. Nest disturbed, chicks abandoned.
2003	Thorgill Bank	SE70729582	4	3	3	1 st brood. 3 pulli ringed.
2003	Thorgill Bank	SE70729582	2	1	?	2 nd brood. Likely to have failed at pulli stage.
2003	Spaunton Moor - Pen Wash	SE71489347	4	+	0	1 st nest. Predated at pulli stage.
2003	Hob Crag	SE71459538	4	0	0	Likely to be 1 st nest. Predated at egg stage.
2004	Hob Crag	SE71459538	4	4	0	Predated at pulli stage. Refurbished 2003 nest.
2004	Matty Carr	SE68809833	4	4	4	Likely to be 1 st brood.
2004	Dale Hd East	NZ68560086	4	4	4	Likely to be 2 nd brood.
2004	Ouzegill Bdg.	SE63909470	2	1	?	1 st brood. 1 egg vanished. 1 pulli ringed.
2005	Sheriff's Pit 1 st	SE69659631	+	1	0	1 st nest. Nest abandoned; reason unknown.
2005	Sheriff's Pit 2 nd	SE69659631	+	0	0	2 nd attempt. Predated at egg stage.
2005	Sheriff's Pit 3 rd	SE69659631	+	3	2	3 rd nest.
2005	Matty Carr quarry	SE68809835	4	4	4	Thought to be 1 st brood.
2005	Lion Inn	SE68249954	(4)	4	4	Likely to be 2 nd brood.
2005	Dale Hd West	NZ67960082	+	+	3	3 fledglings seen near nest.
2006	Sheriff's Pit 1 st	SE69659631	4	0	0	Nest on NW side of pit shaft washed out by heavy rain in mid May.
2006	Sheriff's Pit 2 nd	SE69779609	5	5	5	2 nd attempt 185m south of pit shaft.
2006	Dale Hd West	NZ67930081	4	+	+	Likely to be 2 nd brood. Not known if hatched or fledged.
2007	Hob Crag	SE71459538	3	0	0	1 st nest. Predated at egg stage.
2007	Round Hill Sth	SE69819663	4	4	4	1 st nest.
2007	Dale Hd West	NZ67940079	4	4	4	1 st nest.
2007	Reeking Gill	NZ68920066	4	4	4	1 st nest.
2008	Sturdy Bank 1 st	SE69899991	4	4	4	1 st nest.
2008	Sturdy Bank 2 nd	SE69869990	4	4	3	2 nd nest.
2008	Round Hill Sth	SE69819664	4	4	4	1 st nest. Used refurbished 2007 nest.
2008	Reeking Gill	NZ69140056	5	5	5	1 st nest.
2008	Northdale, West Gill	SE71799957	+	+	3	1 st nest.
2008	Hobb Crag 1 st	SE71449539	4	4	0	1 st attempt. Predated at pulli stage. Used 2003/4 nest site.
2008	Hobb Crag 2 nd	SE71399545	3	0	0	2 nd attempt. Predated at egg stage.
2008	Sheriff's Pit	SE69719626	4	4	4	1 st brood.
2008	Dalehead Nth.	NZ67950102	4	1	0	Likely to be 2 nd attempt. Failed after 1 st hatchling. 1 egg left in nest.
2009	Dale Hd West	NZ67940079	4	4	4	1 st nest.
2009	Sturdy Bank	SE69879991	4	4	3	Likely to be 1 st nest.
2009	Round Hill Sth	SE69539674	4	4	4	1 st nest.
2009	Reeking Gill	NZ69240076	+	+	3	1 st nest.
2009	Sheriff's Pit	SE69729627	(5)	5	5	2 nd nest. 1 st nest at Round Hill Sth.
2010	Ouzegill 1	SE64009511	4	4	3	1 st nest. 1 left early & died near nest.
2010	Ousegill 2	SE63989497	5	3	0	2 nd nest 140m sth of 1st nest. Predated at pulli stage. 2 eggs left.
2010	Ousegill Bridge	SE63929444	5	0	0	Likely to be 2 nd nest. Predated at egg stage.
2010	Sturdy Bank 1 st	NZ69890000	3	3	3	1 st nest.
2010	Sturdy Bank 2 nd	NZ69870005	3	0	0	2 nd nest. Predated at egg stage.
2010	Reeking Gill	NZ69080068	(4)	4	4	1 st nest.
2010	Reeking Gill cut 1 st	NZ68790066	4	4	4	1 st nest.
2010	Reeking Gill cut 2 nd	NZ68860068	(3)	3	3	2 nd nest 69m east of first nest.
2010	Hob Crag 1 st	SE71389544	(4)	4	4	1 st nest.
2010	Hob Crag 2 nd	SE71389544	(4)	4	2	2 nd nest using same nest as 1 st nest.
2010	Sheriff's Pit	SE69739627	+	3	3	1 st nest.
2010	Round Hill (central)	SE69439690	(4)	4	4	1 st nest.
2011	Hob Crag	SE71239557	(4)	4	4	1 st nest.
2011	Round Hill east	SE69459685	(4)	4	4	1 st nest.
2011	Round Hill west	SE69269706	4	4	4	1 st nest.
2011	Matty Carr quarry	SE68809836	4	4	4	1 st nest.
2011	Ousegill Bridge	SE63969475	4	0	0	1 st nest. Likely to have been predated at egg stage.
2011	Sturdy Bank 1 st	NZ69870005	3	3	3	1 st nest.
2011	Sturdy Bank 2 nd	SE69879994	4	3	0	2 nd nest. Nest predated. 1 egg unsure if hatched.
2011	Nab Scar north 1 st	SE69459996	4	4	4	1 st nest.
2011	Nab Scar north 2 nd	NZ69440000	4	3	3	2 nd nest. One egg left in nest.
2011	Reeking Gill 1 st	NZ69150072	4	+	+	1 st nest. Fledged; assumed all 4 left nest.
2011	Reeking Gill 2 nd	NZ69170071	5	5	5	2 nd nest.
2011	Dalehead west 1 st	NZ67930081	4	3	3	1 st nest. One egg left in nest.
2011	Dalehead west 2 nd	NZ67940079	4	3	3	2 nd nest. One egg left in nest.
2011	Dalehead quarry west 1 st	NZ68290085	4	4	4	1 st nest.
2011	Dalehead quarry west 2 nd	NZ68290085	4	+	0	2 nd nest. Nest predated at chick stage.
2011	Dalehead east	NZ68650075	4	4	4	Likely to be 2 nd nest.
2011	Dalehead north	NZ68050125	(4)	4	4	1 st nest.
2011	Thorgill Bank	SE70669580	4	4	0	2 nd nest. Likely to have been predated at chick stage.
2011	Sheriff's Pit	SE69739627	+	2	2	Likely to be 2 nd nest.

? = Outcome unknown + = Exact value unknown (4) = Most likely value

Year	Site	Grid Ref.	Eggs	Hatched	Fledged	Comments
2012	Reeking Gill cutting	NZ68810067	4	4	4	1 st nest.
2012	Nab Scar south	SE69499988	4	3	3	1 st nest. 4 eggs laid, 1 removed.
2012	Sturdy Bank	SE69859996	4	-	-	1 st nest. Nest abandoned at egg stage.
2012	Dalehead west	NZ67940080	4	-	-	1 st nest. Nest abandoned at egg stage.
2012	Sheriff's Pit north	SE69689643	4	4	4	1 st nest.
2012	Sheriff's Pit	SE69739627	+	+	2	2 nd nest.
2012	Round Hill south	SE69449670	4	4	0	1 st nest. Nest predated at chick stage.
2012	Reeking Gill	NZ69190066	4	4	4	1 st nest.
2012	Blakey Lion	SE68239960	5	3	3	1 st nest. 2 fledged 7/6 & 1 fledged 8/6.
2012	Matty Carr south	SE68889818	3	3	0	2 nd nest. Nest predated at chick stage.
2012	Matty Carr quarry	SE68809835	(3)	3	0	Likely replacement 2 nd nest from Matty Carr south pair.
2012	Round Hill west	SE69269706	4	4	3	Likely to be 2 nd nest. One pulli died naturally in nest.
2012	Nab Scar north	NZ69430006	4	0	0	2 nd nest. Nest predated at egg stage.
2012	Spaunton Knowl	SE71709180	+	3	?	1 st nest. 3 naked pulli on 24/5. Outcome unknown.
2013	Reeking Gill cutting	NZ68870065	4	0	0	1 st nest. 4 eggs 14/5. Found abandoned 19/5.
2013	Dalehead west	NZ67940079	4	3	3	1 st nest. 1 hatched 13/5. 3 pulli 23/5. 1 egg left in nest.
2013	Reeking Gill 1.	NZ69240079	4	4	4	1 st nest. 3 pulli 13/5, 4 pulli 21/5. Fledged.
2013	Reeking Gill 2.	NZ69500083	(3)	2	2	2 nd nest. 2 pulli on 21/6 at Day 9/10 stage. Fledged 24/6 1 egg left.
2013	Reeking Gill south 1.	NZ69290043	4	2	2	1 st nest. 2 pulli at Day 6 on 22/5. 2 eggs unhatched.
2013	Reeking Gill south 2.	NZ69330045	(4)	4	4	2 nd nest. 4 pulli on 21/6 at Day 2 stage. Fledged
2013	Hob Crag quarry 2nd	SE71389542	4	0	0	2 nd nest first clutch. Predated at egg stage.
2013	Hob Crag quarry 3rd	SE71449539	4	3	2	3 rd nest second clutch. 3 hatched 20/5. 2 pulli in nest on 1/6.
2013	Hob Crag quarry 4th	SE71379543	4	4	4	4 th nest third clutch.
2013	Hob Crag north	SE71189566	3	3	0	Late 2 nd nest. 3 eggs on 27/6. Hatched 4/7. Predated.
2013	Sheriff's Pit 1.	SE69729626	+	2	2	1 st nest. Look to be 2 pulli. 2 fledglings seen near nest on 27/5.
2013	Sheriff's Pit 2.	SE69729626	+	3	3	2 nd nest. Look to be 3 pulli at possibly at Day 8 stage on 24/6.
2013	Round Hill west	SE69259705	4	4	4	1 st nest (late). 4 pulli seen in nest 10/6. Fledged 11/6.
2013	Round Hill south 1.	SE69689671	4	3	3	1 st nest. Still in nest on 30/5. Likely fledged 31/5. 1 egg broken.
2013	Round Hill south 2.	SE69599670	4	4	3	2 nd nest. 1 just hatched, 1 hatching, on 1/7. 1 dead left in nest.
2013	Blakey Lion north	SE68049997	(4)	4	4	1 st nest. Likely to have fledged after 12 days.
2014	Round Hill west	SE69269706	4	4	3	1 st nest. 3 pulli seen on 12/5. Fledged 15/5.
2014	Round Hill west	SE69249709	4	4	0	2 nd nest. 4 pulli seen at Day 6 on 19/6. Predated between D6 & 10.
2014	Round Hill east	SE69419681	4	4	4	1 st nest. 1 egg 3 pulli just hatched on 12/5. 4 pulli 19/5 7 days old.
2014	Blakey Lion south	SE68269954	4	4	4	1 st nest.
2014	Hob Crag quarry	SE71379543	4	4	0	1 st nest. Predated at chick stage.
2014	Thorgill Bank quarry	SE70739582	3	+	0	1 st nest. Predated at chick stage. 2 eggs 1 pullus just hatched 5/5.
2014	Thorgill Head	SE69909568	5	4	0	Replacement nest. Found predated 7/6 4 pulli 3 days 1 egg left.
2014	Matty Carr quarry	SE68809836	4	4	3	1 st nest. 4 pulli 4 days old on 19/5. Likely fledged 28/5 at 12 days.
2014	Spindle Thorn	SE71319313	4	4	4	1 st nest. 4 pulli seen at Day 11 on 20/5. Fledged 23/5 at 13 days.
2014	Sheriff's Pit	SE69799625	(4)	4	4	1 st nest. 4 pulli 29/5 11 days. Nest empty & 2 dead near nest 31/5.
2014	Sheriff's Pit	SE69739628	(3)	3	3	2 nd nest. 3 pulli on 30/6 at Day 8/9. Fledged 6/7.
2014	Reeking Gill west	NZ69030069	4	0	0	1 st nest. 4 eggs on 30/4. Predated at egg stage.
2014	Reeking Gill quarry	NZ69170053	4	0	0	1 st nest. 4 eggs on 30/4. Predated at egg stage.
2014	Reeking Gill south	NZ69280044	4	4	4	1 st nest. 4 days old on 13/5. Fledged at 11 days.
2014	Reeking Gill	NZ69120066	4	(4)	3	2 nd nest. 2 pulli just hatched & 2 eggs on 17/6. 3 pulli on 28/6.
2014	Nab Scar south	SE69529986	4	0	0	Replacement nest? F. sitting on 4 eggs on 21/5. Predated.
2014	Farndale - Breckon Bank	SE68699508	4	4	4	1 st nest. 2 eggs & 2 pulli hatched 5/5. Fledged 18/5 at 13 days.
2014	Farndale - High Blakey Moor	SE66679945	4	4	4	1 st nest. Fledged 22/5 at 12 days.
2014	Esklets - Esklets Crags south	NZ66250159	4	4	?	1 st nest. 4 pulli on 15/5, 4 days old. Nest not checked after 15 th .
2014	Esklets - Esklets Crags north	NZ65910236	4	4	?	1 st nest. 4 pulli on 15/5, 4 days old. Nest not checked after 15 th .
2015	Spindle Thorn	SE71319320	4	4	4	1 st nest. 4 pulli just hatched 25/5. Likely fledged 5/6.
2015	Bank Top	SE71799497	4	1	0	1 st nest. 1 pullus & 3 eggs on 12/5. Found predated 20/5.
2015	Bank Top	SE71749480	(3)	3	3	Replacement nest. 3 pulli on 16/6 at 9days. Fledged 19/6.
2015	Hob Crag quarry	SE71429536	4	?	0	1 st nest. 4 eggs 12/5. Found predated 20/5.
2015	Hob Crag north	SE71239558	4	0	0	1 st nest. 4 eggs 12/5. 4 eggs 20/5 & nest abandoned.
2015	Thorgill Bank quarry	SE70749586	4	0	0	1 st nest. 1 egg 8/5, 4 eggs 12/5. Found predated 22/5.
2015	Thorgill Bank west	SE70549571	4	4	4	Replacement nest for TB quarry. 4 pulli 3 days 6/6. Fledged 19/6.
2015	Sheriff's Pit	SE69739627	(4)	4	3	1 st nest. 4 seen 22/5, 3 seen 26/5 about to fledge.
2015	Round Hill east	SE69419681	4	3	0	1 st nest. 3 pulli & 1 egg on 12/5. Found predated 20/5.
2015	Blakey Lion south	SE68209960	3	0	0	1 st nest. 3 eggs removed from nest. Nest predated.
2015	Reeking Gill	NZ69210076	4	1	1	1 st nest. 4 eggs 11/5. 1 pullus no eggs 20/5. Likely fledged 26/5.
2015	Reeking Gill	NZ69120066	4	4	4	2 nd nest. 4 eggs 9/6. 1 hatch 3 eggs 15/6. Likely fledged 29/5.
2015	Nab Scar north	SE69449997	3	2	2	1 st nest. 3 eggs 11/5. 2 pulli no egg 20/5. Likely fledged 27/5.
2015	Round Hill west	SE69249709	+	+	3	1 st nest. 3 juvs being fed by adults 26/5. Likely fledged 26/5.
2015	Bank Top east	SE72--94--	+	+	3	Fledglings seen being fed by Adults 9/6 & 16/6.
2016	Bank Top	SE72039473	4	0	0	1 st nest. Predated.
2016	Bank Top	SE71899471	+	+	2	2 nd (replacement) 2 fledglings seen being fed by Adults
2016	Hob Crag	SE71259544	+	+	2	1 st nest. 2 fledglings seen being fed by Adults
2016	Thorgill Bank quarry	SE70729581	4	3	1	1 st nest. 1 fledgling seen being fed by Adult.
2016	Sheriff's Pit	SE69739627	(3)	3	3	1 st nest.
2016	Sheriff's Pit	SE69739627	(3)	3	3	2 nd nest.
2016	Round Hill south	SE69699673	+	+	(3)	1 st nest. 1 fledgling seen being fed by Adults 7/6.
2016	Round Hill south	SE69699673	+	+	(2)	2 nd nest. 2 fledgling seen being fed by Adults 2/7.
2016	Round Hill east	SE69419681	4	4	0	1 st nest.
2016	Matty Carr quarry	SE68809838	4	(0)	0	1 st nest. Predated.
2016	Matty Carr quarry	SE688-983-	(3)	(3)	3	2 nd nest (replacement). 3 fledglings seen being fed by Adults
2016	Thorgill west	SE701-955-	(3)	(3)	3	1 st nest. Male & 3 fledglings flying strong around T. west area.
2016	Sledge Shoe	SE690-976-	(3)	(3)	3	2 nd nest. 3 fledglings seen being fed by Adults
2017	Round Hill west	SE69259704	3	2	2	2 nd nest. One egg infertile.
2017	Thorgill Bank east	SE70939583	4	4	4	1 st nest. New territory.
2017	Sheriff's Pit north 1.	SE69669645	4	4	0	1 st nest. Predated at chick stage.
2017	Sheriff's Pit north 2.	SE69709642	(4)	4	4	2 nd nest (replacement).
2017	Hob Crag north	SE71219559	4	4	4	1 st nest. Refurbished 2015 nest.
2017	Hob Crag west	SE71139530	4	0	0	2 nd nest. Eggs smashed. Likely been trampled.
2017	Matty Carr west	SE68709833	(4)	4	4	1 st nest.
2017	Dalehead west	NZ67900080	(3)	(3)	3	1 st nest.
2017	Loskey Side	SE70809330	4	4	4	2 nd nest.
2017	Reeking Gill	NZ69200080	5	5	0	2 nd nest. Likely perished during prolonged rain on 08-09/6.
2017	Sturdy Bank	SE69869996	2	0	0	1 st nest. Predated at egg stage. Not known if clutch completed.
2017	High Blakey Moor - Farndale	SE65859985	4	(2)	2	1 st nest. Located 01/05. Likely just 2 eggs hatched.

? = Outcome unknown + = Exact value unknown (4) = Most likely value

ANNEX 4 - Table of Nest Aspect and Elevation from 1999 to 2017

Table 1: Aspect & elevation of nest sites mainly in the Rosedale area of the North York Moors.

Year	Location	Grid Reference	Aspect	Elevation
1999	Rosedale - Sheriff's Pit	SE 6973 9627	NNW	331m
1999	Blakey Crossing	SE 6830 9900	SSW	370m
2000	Spaunton Moor - Penwash	SE 7147 9347	SSW	240m
2002	Rosedale - Bank Top	SE 7204 9483	NNW	310m
2003	Rosedale - Round Hill	SE 6927 9710	N	336m
2003	Rosedale - Hobb Crag	SE 7145 9538	NNE	313m
2003	Rosedale - Thorgill Head	SE 6999 9559	NNE	330m
2003	Rosedale - Thorgill Bank	SE 7073 9580	NE	308m
2003	Spaunton Moor - Penwash	SE 7148 9347	NE	249m
2003	Rosedale - Thorgill Bank	SE 7072 9582	ENE	309m
2004	Rosedale - Matty Carr Hill	SE 6880 9833	E	358m
2004	Rosedale - Sheriff's Pit	SE 6971 9626	SSE	331m
2004	Rosedale - DaleHead (east)	NZ 6856 0086	SW	330m
2005	Rosedale - Sheriff's Pit	SE 6971 9626	NE	339m
2005	Rosedale - Blakey Lion	SE 6824 9954	ENE	362m
2005	Rosedale - Dale Head (west)	NZ 6796 0082	E	349m
2005	Rosedale - Sheriff's Pit	SE 6971 9626	ESE	333m
2005	Rosedale - Matty Carr Hill	SE 6880 9835	SE	331m
2005	Rosedale - Sheriff's Pit	SE 6971 9626	SW	331m
2006	Rosedale - Sheriff's Pit (south)	SE 6979 9610	N	339m
2006	Rosedale - Dale Head (west)	NZ 6793 0080	E	362m
2006	Rosedale - Sheriff's Pit	SE 6971 9626	ESE	333m
2007	Rosedale - Reeking Gill (west)	NZ 6892 0066	N	321m
2007	Rosedale - Round Hill (south)	SE 6981 9664	NNE	297m
2007	Rosedale - Hob Crag	SE 7138 9546	E	313m
2007	Rosedale - Dale Head (west)	NZ 6794 0079	S	357m
2008	Rosedale - Round Hill (south)	SE 6981 9664	NNE	297m
2008	Rosedale - Hob Crag 1 st	SE 7144 9539	NNE	310m
2008	Rosedale - Hob Crag 2 nd	SE 7139 9545	NE	313m
2008	Northdale - West Gill	SE 7179 9957	NE	308m
2008	Rosedale - Dalehead (north)	NZ 6795 0102	NE	353m
2008	Rosedale - Sheriff's Pit	SE 6971 9626	SSE	331m
2008	Rosedale - Sturdy Bank 1 st	SE 6989 9991	W	307m
2008	Rosedale - Sturdy Bank 2 nd	SE 6986 9990	SSW	281m
2008	Rosedale - Reeking Gill	NZ 6914 0056	W	322m
2009	Rosedale - Reeking Gill	NZ 6924 0076	S	359m
2009	Rosedale - Sturdy Bank	SE 6987 9991	SW	282m
2009	Rosedale - Dale Head (west)	NZ 6794 0079	S	357m
2009	Rosedale - Round Hill (south)	SE 6953 9674	NE	330m
2009	Rosedale - Sheriff's Pit	SE 6972 9627	NE	345m
2010	Rosedale - Sturdy Bank	SE 6988 0004	W	324m
2010	Rosedale - Hob Crag (1 st & 2 nd)	SE 7138 9544	NE	315m
2010	Rosedale - Sheriff's Pit	SE 6973 9627	NE	340m
2010	Rosedale - Round Hill (central)	SE 6943 9690	ENE	328m
2010	Rosedale - Reeking Gill	NZ 6908 0068	SE	317m
2010	Rosedale - Reeking Gill cutting 1 st	NZ 6879 0066	S	328m
2010	Rosedale - Reeking Gill cutting 2 nd	NZ 6886 0068	SE	329m
2010	Rosedale - Dalehead (quarry west)	NZ 6828 0082	S	281m
2010	Bransdale - Ousegill 1 st	SE 6400 9511	W	250m
2010	Bransdale - Ousegill 2 nd	SE 6398 9497	E	250m
2010	Bransdale - Ousegill Bridge	SE 6392 9444	W	225m
2011	Rosedale - Hob Crag (north)	SE 7123 9557	NW	313m
2011	Rosedale - Thorgill Bank	SE 7066 9580	NW	307m
2011	Rosedale - Sheriff's Pit	SE 6972 9627	SE	343m
2011	Rosedale - Round Hill (east)	SE 6945 9685	E	321m
2011	Rosedale - Round Hill (west)	SE 6926 9706	NE	352m
2011	Rosedale - Matty Carr quarry	SE 6880 9836	NW	343m
2011	Rosedale - Dalehead (north)	NZ 6805 0125	SW	341m
2011	Rosedale - Dalehead (west) 1 st	NZ 6793 0081	SW	352m
2011	Rosedale - Dalehead (west) 2 nd	NZ 6794 0080	SW	347m
2011	Rosedale - Dalehead (east)	NZ 6865 0076	NE	328m
2011	Rosedale - Dalehead quarry (west) 1 st & 2 nd	NZ 6830 0085	E	296m
2011	Rosedale - Reeking Gill 1 st	NZ 6915 0072	S	333m
2011	Rosedale - Reeking Gill 2 nd	NZ 6917 0071	S	319m
2011	Rosedale - Nab Scar north 1 st	SE 6945 9996	SW	337m
2011	Rosedale - Nab Scar north 2 nd	NZ 6944 0000	SW	339m
2011	Rosedale - Sturdy Bank 1 st	NZ 6987 0005	E	343m
2011	Rosedale - Sturdy Bank 2 nd	SE 6987 9994	W	288m
2011	Bransdale - Ousegill	SE 6396 9475	E	240m

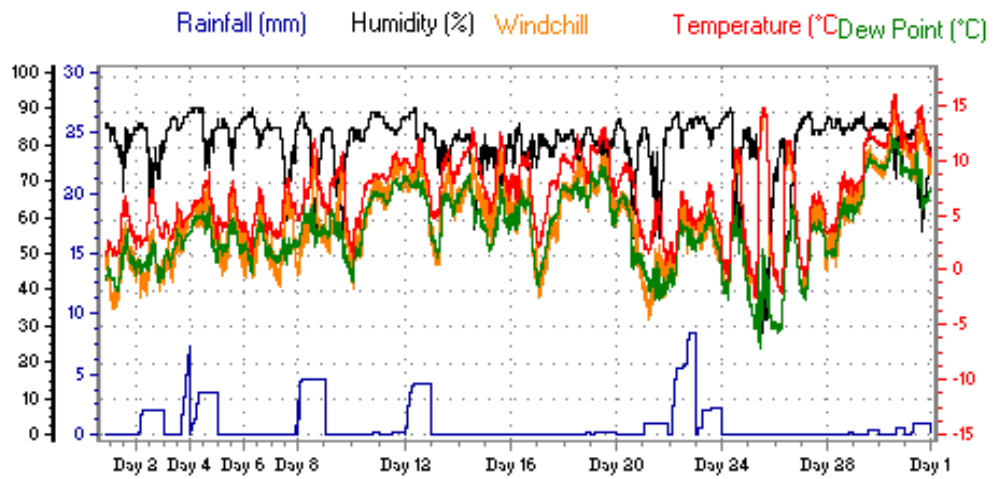
Year	Location	Grid Reference	Aspect	Elevation
2012	Rosedale - Sheriff's Pit (north)	SE 6968 9643	N	343m
2012	Rosedale - Round Hill (south)	SE 6944 9670	NW	350m
2012	Rosedale - Dalehead (west)	NZ 6794 0080	SW	347m
2012	Rosedale - Reeking Gill cutting	NZ 6881 0067	S	328m
2012	Rosedale - Reeking Gill	NZ 6919 0066	N	334m
2012	Rosedale - Nab Scar (south)	SE 6949 9988	SSW	330m
2012	Rosedale - Sturdy Bank	SE 6985 9996	SSE	300m
2012	Rosedale - Blakey Lion	SE 6823 9960	E	366m
2012	Rosedale - Matty Carr (south)	SE 6888 9819	SSE	357m
2012	Rosedale - Round Hill (west)	SE 6926 9706	NE	352m
2012	Rosedale - Nab Scar (north)	NZ 6943 0006	SSW	345m
2012	Rosedale - Sheriff's Pit	SE 6972 9627	SE	343m
2012	Rosedale - Matty Carr quarry	SE 6880 9835	SE	331m
2013	Rosedale - Hob Crag quarry 1 st (abandoned)	SE 7137 9543	-	-
2013	Rosedale - Hob Crag quarry 2 nd (predated)	SE 7138 9542	NW	305m
2013	Rosedale - Hob Crag quarry 3 rd 1 st fledged	SE 7144 9539	N	295m
2013	Rosedale - Hob Crag quarry 4 th 2 nd fledged	SE 7137 9543	NE	304m
2013	Rosedale - Hob Crag north	SE 7118 9566	E	314m
2013	Rosedale - Thorgill Bank	SE 7075 9584	ENE	294m
2013	Rosedale - Sheriff's Pit 1 st & 2 nd	SE 6972 9626	SE	343m
2013	Rosedale - Round Hill south 1 st	SE 6968 9671	NNE	279m
2013	Rosedale - Round Hill south 2 nd	SE 6959 9670	ENE	307m
2013	Rosedale - Round Hill west	SE 6925 9705	ENE	344m
2013	Rosedale - Blakey Lion north	SE 6804 9997	E	365m
2013	Rosedale - Dalehead west	NZ 6794 0079	E	354m
2013	Rosedale - Reeking Gill cutting	NZ 6887 0065	N	335m
2013	Rosedale - Reeking Gill 1 st	NZ 6924 0079	SE	370m
2013	Rosedale - Reeking Gill 2 nd	NZ 6950 0083	SSE	392m
2013	Rosedale - Reeking Gill south 1 st	NZ 6929 0043	WSW	358m
2013	Rosedale - Reeking Gill south 2 nd	NZ 6933 0045	WSW	367m
2014	Rosedale west - Round Hill west 1 st	SE 6926 9706	NE	350m
2014	Rosedale west - Round Hill west 2 nd	SE 6924 9709	E	351m
2014	Rosedale west - Round Hill east	SE 6941 9681	NE	339m
2014	Rosedale west - Blakey Lion south	SE 6826 9954	E	369m
2014	Rosedale west - Hob Crag quarry	SE 7137 9543	NE	304m
2014	Rosedale west - Thorgill Bank	SE 7073 9582	E	308m
2014	Rosedale west - Thorgill Head	SE 6990 9568	WSW	331m
2014	Rosedale west - Matty Carr quarry	SE 6880 9836	W	327m
2014	Rosedale west - Spindle Thorn	SE 7131 9313	NW	218m
2014	Rosedale west - Sheriff's Pit 1 st	SE 6980 9625	E	337m
2014	Rosedale west - Sheriff's Pit 2 nd	SE 6973 9627	NNE	340m (ground level 343m)
2014	Rosedale east - Reeking Gill west	NZ 6903 0069	S	318m
2014	Rosedale east - Reeking Gill quarry	NZ 6917 0053	S	310m
2014	Rosedale east - Reeking Gill south	NZ 6928 0044	WSW	358m
2014	Rosedale east - Reeking Gill	NZ 9162 0066	SW	307m
2014	Rosedale east - Nab Scar south	SE 6952 9986	SSW	332m
2014	Farndale east - Breckon Bank	SE 6869 9508	SSW	315m
2014	Farndale east - High Blakey Moor	SE 6667 9945	SSE	373m
2014	Esklets east - Esklets Crag south	NZ 6625 0159	SW	309m
2014	Esklets east - Esklets Crag north	NZ 6591 0236	SW	287m
2015	Rosedale - Thorgill Bank quarry	SE 7075 9584	ENE	294m
2015	Rosedale - Thorgill Bank west	SE 7055 9572	NNW	316m
2015	Rosedale - Sheriff's Pit 1 st	SE 6972 9626	SE	343m
2015	Rosedale - Spindle Thorn	SE 7131 9320	E	228m
2015	Rosedale - Bank Top 1 st	SE 7179 9497	SSE	321m
2015	Rosedale - Bank Top 2 nd (replacement)	SE 7174 9480	NE	321m
2015	Rosedale - Round Hill east	SE 6941 9681	NE	339m
2015	Rosedale - Hob Crag	SE 7142 9536	NE	315m
2015	Rosedale - Hob Crag north	SE 7123 9558	SW	315m
2015	Rosedale - Blakey Lion south	SE 6823 9960	NE	363m
2015	Rosedale - Reeking Gill 1 st	NZ 6924 0079	S	358m
2015	Rosedale - Reeking Gill 2 nd	NZ 6913 0065	SW	304m
2015	Rosedale - Nab Scar north	SE 6944 0001	W	343m
2016	Rosedale - Bank Top	SE 7203 9473	ENE	331m
2016	Rosedale - Thorgill Bank quarry	SE 7072 9581	E	300m
2016	Rosedale - Sheriff's Pit 1 st	SE 6972 9626	SE	343m
2016	Rosedale - Sheriff's Pit 2 nd	SE 6972 9626	SE	343m
2016	Rosedale - Round Hill east	SE 6941 9681	NE	339m
2016	Rosedale - Matty Carr quarry	SE 6880 9838	E	335m
2017	Rosedale - Matty Carr west	SE 6870 9833	E	362m
2017	Rosedale - Round Hill west	SE 6925 9704	N	347m
2017	Rosedale - Sheriff's Pit north 1 st	SE 6966 9645	NNE	341m
2017	Rosedale - Sheriff's Pit north 2 nd	SE 6970 9642	N	339m
2017	Rosedale - Sturdy Bank	SE 6986 9996	S	299m
2017	Rosedale - Loskey Side	SE 7080 9330	W	241m
2017	Rosedale - Reeking Gill	NZ 6920 0080	W	364m
2017	Rosedale - Dalehead west	NZ 6790 0080	E	366m

ANNEX 5 - Table of Late:Early Territory Occupancy from 2008 to 2017

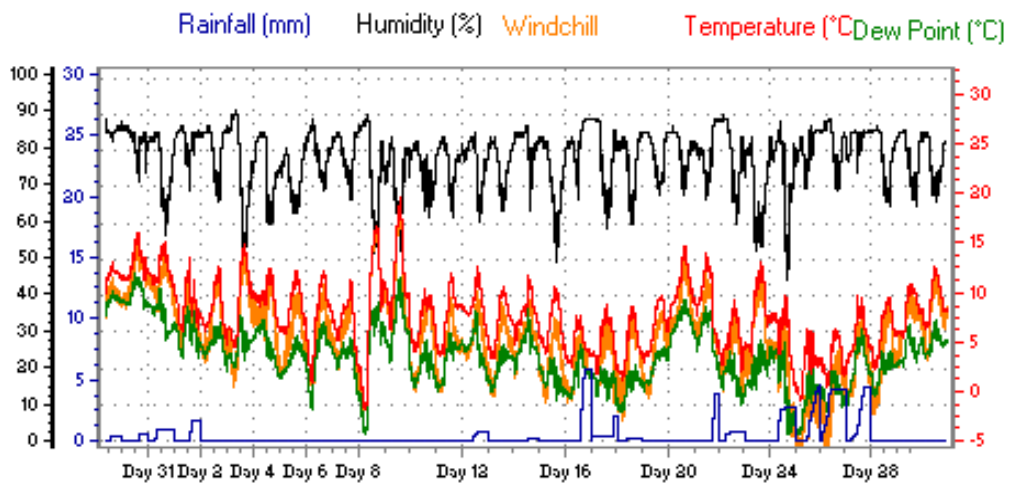
Table 1: Late and Early territory occupancy in the Rosedale area of the North York Moors between 2008 and 2017.

	2008		2009		2010		2011		2012		2013		2014		2015		2016		2017	
	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late
Spindle Thorn		✓							✓			✓	✓				✓		✓	
Loskey Side (ford)																				✓
Loskey Beck (area)													✓		✓					✓
Bank Top							✓		✓		✓		✓		✓	✓	✓	✓	✓	
Bank Top east																				
Hob Crag quarry	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓	
Hob Crag north										✓	✓	✓			✓	✓				✓
Hob Crag west																				✓
Thorgill Bank quarry							✓	✓	✓		✓	✓	✓		✓		✓			
Thorgill Head													✓							
Thorgill Bank east																				✓
Thorgill Bank west															✓		✓			✓
Sheriff's Pit	✓			✓	✓			✓		✓	✓	✓	✓	✓	✓		✓	✓		
Sheriff's Pit north										✓									✓	✓
Round Hill south	✓	✓	✓							✓		✓	✓	✓			✓	✓	✓	
Round Hill east	✓	✓	✓	✓	✓		✓		✓				✓		✓		✓			
Round Hill west							✓		✓	✓	✓		✓	✓	✓		✓	✓	✓	
Sledge Shoe			✓							✓	✓	✓	✓		✓	✓	✓	✓	✓	
Matty Carr south										✓					✓					
Matty Carr quarry	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓			
Matty Carr west																				✓
Blakey Lion south										✓		✓		✓						
Blakey Lion north												✓								
Blakey Swang north	✓																			
Dalehead west			✓				✓	✓	✓		✓						✓		✓	✓
Dalehead north	✓	✓			✓		✓			✓			✓							
Dalehead east								✓												
Dalehead quarry east					✓	✓					✓									
Dalehead quarry west						✓	✓	✓	✓						✓		✓			
Reeking Gill cutting	✓				✓	✓			✓		✓									
Reeking Gill west													✓							
Reeking Gill	✓		✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓				✓	✓
Reeking Gill quarry	✓											✓	✓							
Reeking Gill south							✓				✓	✓	✓	✓						
Nab Scar north			✓		✓	✓	✓	✓		✓	✓	✓		✓	✓					
Nab Scar south					✓				✓				✓							
Sturdy Bank	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		✓					✓
Total	11	6	8	5	11	7	13	10	16	9	18	12	20	7	15	6	11	6	14	7
Occupancy	0.54		0.62		0.64		0.77		0.56		0.67		0.35		0.40		0.54		0.50	

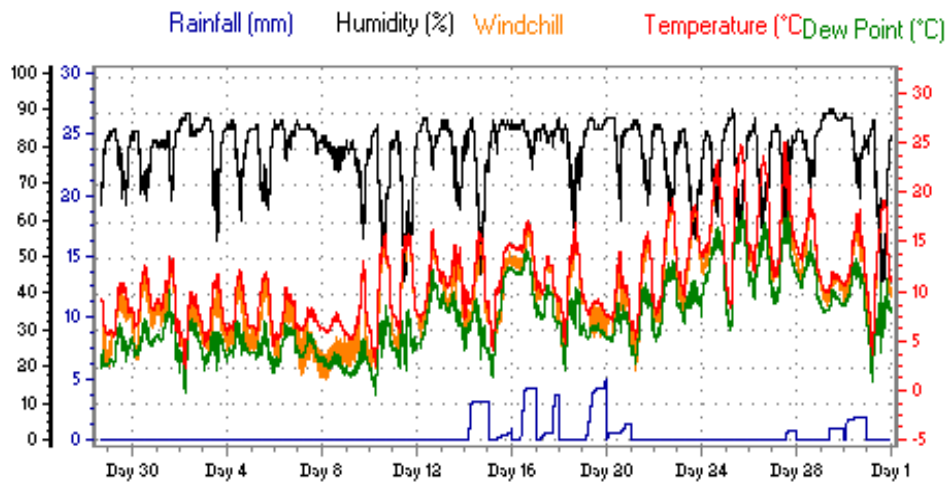
ANNEX 6 - Graphs of Daily Temperature and Rainfall for the Months March to June 2017



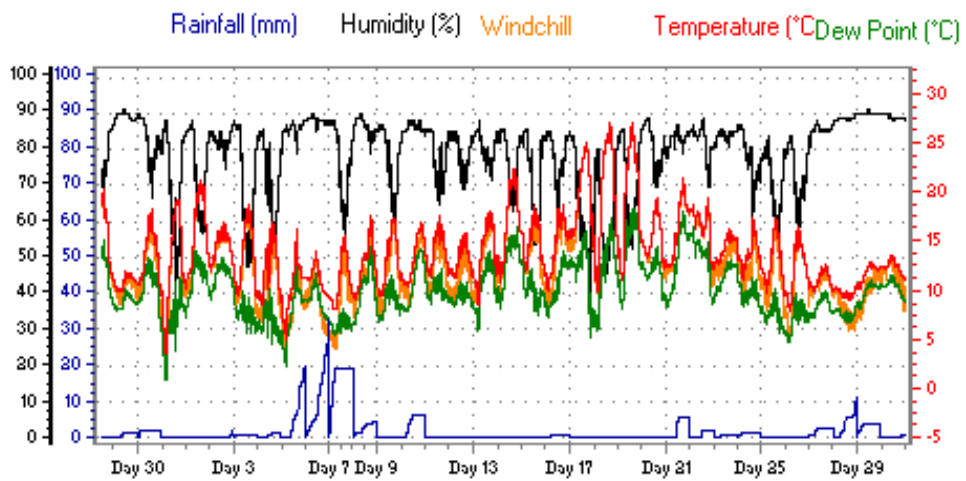
March



April



May



June

Daily max/min temperature & rainfall recorded at Westerdale, NZ665058, altitude 180m, in 2017.