

Whinchat Conservation on the Long Mynd

Project report 2021



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Whinchat Conservation on the Long Mynd, Shropshire Project Report 2021

The project is part of the Shropshire Hills region of the Our Upland Commons project (OUC),
funded by National Lottery Heritage Fund and National Trust

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Introduction

Nationally, the Whinchat population has declined by 53% in the UK, and 44% in England, in only 21 years between 1995 and 2016. It was moved from the *Amber List of Birds of Conservation Concern* to the *Red List* in 2015 because of this severe decline in the breeding population. The decline has continued, and Whinchat remains on the updated Red List (BoCC5, published in 2021).

Whinchat used to be widespread in Shropshire, but by the time of the first Breeding Bird Atlas (1985-90) they were largely restricted to the uplands, with a county population estimated at 300 pairs. The second Bird Atlas (2008-13) found a large contraction of range, and the species was, by then, restricted to the Long Mynd, apart from the occasional pair on the Stiperstones, with an estimated population of 75 pairs, a decline of 75% in less than 25 years.

Local monitoring on the Long Mynd has found a decline there from 110-130 breeding pairs in 1996-1998, to around 60 pairs in 2006-09, a decline of around 50% in only 10 years, and a continuing decline since, to around 40 pairs in 2017.

The local monitoring showed that all Whinchats have bracken in their territories, but densities are higher if the bracken has an understory of heather, or grass, rather than bracken litter. More understanding is needed on whether changes to the bracken itself (increased density as a result of climate change and changes in grazing pressures) are a factor in the population decline.

A Pilot Project was therefore carried out in 2019 within the Development Phase of the *Our Common Cause: Our Upland Commons* project, funded by the Heritage Lottery, to test and evaluate proposals for a Whinchat conservation project on the Long Mynd, to be included in the Delivery Phase of the *Commons* project 2020-23.

Results of the 2019 Pilot Project

Monitoring of the population of Whinchat and other upland species has been carried out by 10 or so volunteers, through the Long Mynd Breeding Bird Survey (LMBBS) since 2017. In 2019, several of the volunteers made additional visits to look specifically for Whinchat.

Nest finders were funded for 12 days, and provided with a map showing all observations of Whinchats by the LMBBS volunteers in the period up to 8 May, to identify search areas. This made the time of the nest finders much more productive.

Eleven nests were found, 10 by the nest finders, and one relay by a pair that lost their first nest early on (found by the ringer).

Of the 10 nests found early, five were successful, and five failed. Of the failed nests:-

- 2 empty when revisited a week later: predated
- 1 not found a week later: unknown
- 1 with abandoned eggs: natural causes, or adult female predated
- 1 with dead chicks: unknown, possibly abandoned due to torrential rain

Of these 10 nests found early, eight were in bilberry, and two were in bracken.

A total of 23 individuals were colour-ringed, four adults (one male before nesting, and two males and a female when taking food to nests) and 19 nestlings from 4 nests. A brood of five were ringed but not colour-ringed, as handling and time spent at the nest had to be curtailed due to the rain.

Based on the results of the intensive search by LMBBS volunteers, the nest finding project, and the ringing, the population was estimated at 52 breeding pairs, a slight increase on the previous estimate.

A full report of the pilot project was produced, and is available on request. The report included maps showing all observations and the grouping of these observations into territories, and ringing results.

A revised project proposal, incorporating the results and lessons of the Pilot Project, was submitted to *Our Common Cause: Our Upland Commons* (OCC). It is attached as Appendix 1, and it has been incorporated into the successful bid to National Lottery Heritage Fund for the Delivery phase of what is now known as the *Our Upland Commons* (OUC) project. It was intended to undertake the project in each of the three years 2020-22, but the start was deferred for a year due to coronavirus restrictions.

This 2021 report therefore covers the first year of a three-year project 2021-24.

Long term aims

The long-term aim is to establish the reasons for the Whinchat decline, and take action to reverse it, by

1. finding a large proportion of Whinchat nests, and monitoring the outcomes using trail cameras, to ascertain if breeding productivity is sufficient to maintain the population
2. identifying the common factors between the nest sites and territories, to inform options for conservation management
3. colour-ringing adults and nestlings, so each individual is uniquely identifiable, and monitoring movements and rate of return, to assess the size of each territory and hence its composition (the habitat preferences) and whether factors away from the breeding site contribute to the decline
4. trial different approaches to bracken management, which will take into account the needs of Whinchats identified through (2) above, but also the needs of sheep and graziers on the common

Methods 2021

The project aimed to find at least 30 Whinchat nests on the Long Mynd (more than 50% of the estimated population), monitor the outcomes using trail cameras and thermacrons, colour-ring the chicks in the successful nests, and catch as many of the breeding adults as possible.

The contractor who undertook the Pilot Project (BiOME Consulting) was re-appointed to find the nests, to make full use of what they had learnt and the experience gained, and they were provided with the distribution map of all territories from the 2019 LMBBS survey. It was intended to also provide a map of LMBBS observations up until 8 May 2021, but poor weather in early May limited the number of visits, so, although a map was compiled, it was of very limited value.

The Pilot Project showed that nests were relatively easy to find while they were being built, and while clutches were being completed, then very difficult to find during incubation, then easier to find, when adults start taking food back to the nest for nestlings. Nest finding was therefore concentrated in the earlier period, between 17 - 27 May, but continued throughout the season, to find re-lays of failed nests, and find more nests when chicks were being fed.

Nests were marked in the field with canes. A spreadsheet was set up on Google Drive, with a separate row for each nest found, to record its location (a 10-figure GPS grid reference) and contents. New data columns were added to the spreadsheet as required, and the results of

each visit to each nest were entered immediately by the nest finder / monitor / ringer. At the end of the season, the spreadsheet contained a complete record of every nest and visit (i.e., all the data needed to compile this report).

The ringer initially spent time trying to catch adults before they nested, and then visited every known nest when chicks should be old enough to ring, but not old enough to “explode” from the nest (leave it prematurely). Each adult that was caught, and each chick in the nest, was fitted with a ring from the British Trust for Ornithology (BTO) national ringing scheme, and a unique combination of colour-rings.

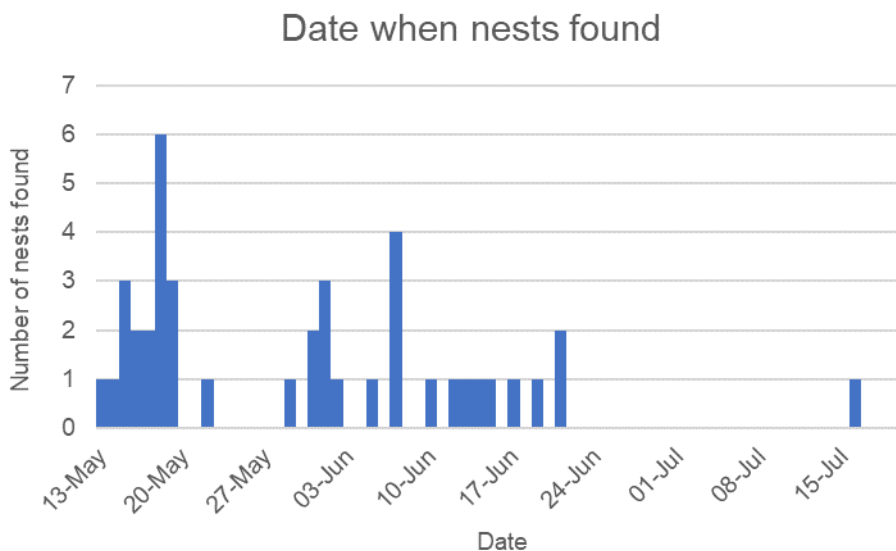
A form was prepared by the National Trust Ecologist to record the habitat of every nest found, its immediate surroundings, and the territory around it (100m radius). The form was completed by the finder, when each nest was found, and again by National Trust staff in July (when the extent of the bracken would be more apparent), who re-visited every site.

Results

Nests found

BiOME considered that finding the target of 30 nests before 27 May with the team of two utilised in 2019 was unrealistic, and recruited seven additional local experienced nest-finders to help. Even with this additional help, only 18 nests were found before 27 May. Three more were found before the end of May, 18 were found in the first 21 days of June, and the last on 17 July, a total of 40 nests.

The contract with BiOME provided for 22 days nest-finding. The additional helpers enabled the paid nest-finding time to be increased, and by 4 June the team had completed 39 days of nest finding, and found 25 nests. They were then informed that the budget had been spent, but most continued on a voluntary basis. Fifteen of the nests were found after the nest finders were informed that they would not be paid for their continued efforts.



In particular, the project plan and budget made no provision for the time necessary to find second nests (relays) of pairs that lost their first clutch. As this report shows, finding these nests and monitoring each outcome is essential to achieving one of the key objectives of the project – is breeding productivity sufficient to maintain the population?

Without the additional nest finders, and their commitment to carry on with the work after the budget was spent, the project would have been far less successful.

An application has been made for an increase in the nest-finding budget for 2022 and 2023, to fund the amount of nest-finding work actually carried out in 2021.

Whinchat Nests and Territories

The Nest-finding project found 40 nests, of which 8 were replacements for first nests that failed, so the nests of 32 pairs were found. Map 1 shows the locations of all 40 nests.

The observations of the LMBBS volunteers were grouped into territories, then the territories of the 32 pairs with known nest locations were discounted, leaving a further possible 22 pairs. Other observations by the nest-finders were then considered, adding 7 more possible territories. Evidence was found that almost all of these additional pairs were probable or confirmed breeding, but only possible breeding evidence was found for seven, giving a total estimated breeding population of 54 - 61 pairs.

The distribution of these pairs is shown in Map 2. Each pair is represented by a single dot (only the second nest of the pairs that lost their first clutch and re-laid is shown).

To help with analysis, an approximate line (the thin blue line) has been drawn on the maps, marking the boundary where the steep-sided valleys begin to level out onto the upland plateau. The boundary was drawn by eye, using the change in the separation of contours on the map. In previous years, this has proved helpful in analysing the habitat preferences of several species, as some only use flattish heathland, and some rarely do.

The Location and Outcome of every nest is shown in Appendix 2.

Nest Outcomes

Eight pairs failed initially, but a second nest was found for each of them, five of which were successful. Nests of 32 pairs were found, and 24 (75%) produced fledged young. In a few cases fledged young were seen nearby, but in most cases the outcome was judged from field signs at the nest cup after fledging

Eight pairs apparently failed altogether, including the three which made two attempts: two nests were predated just before fledging (after ringing), three pairs lost eggs and no new nest was found, no eggs were laid in two nests (it is believed the female was predated in one of these cases), and one pair lost two clutches to predation. It is unlikely that a pair would make three nesting attempts, but it is possible that some of the other five pairs that apparently failed did make another breeding attempt, which was not found.

A camera showed one first nest was trampled by sheep, but the pair's second nest was successful. Seven other nests with eggs were predated or abandoned, but the cause is unknown.

Nest Record Cards for 34 nests in which eggs were laid have been submitted to BTO.

The outcome of all 40 nests is summarised in Table 1.

Table 1. Nest Outcomes

Nest Outcomes	Total
Ringed & Fledged	21
Fledged (not ringed)	3
Failed after ringing	2
Failed before eggs, moved, new nest with eggs found	4
Failed before eggs, no new nest found	2
Failed on eggs, relaid, new nest with eggs found	4
Failed on eggs (second nest)	1
Failed on eggs, no new nest found	3
Total	40

Predation

One adult female was believed predated, eggs in three nests were predated (eggs removed from nest), and eggs in four nests were abandoned (eggs left in nest), and two nests with well grown young were predated. It is possible that nests were abandoned because of close encounters with predators, but that is unknown. Unfortunately, the cameras provided no evidence on the predators involved.

While siting the cameras proved difficult, because of angle of slope and growing vegetation obscured the view, it is unlikely that any large predator (fox, Carrion Crow) could have visited a nest with a camera without being recorded. Sheep were recorded at the trampled nest.

Productivity

Chicks in three nests were not ringed, but 126 chicks in 23 nests were ringed; two of these broods are known to have been subsequently predated. Assuming that all ringed chicks in the successful nests fledged, then 114 chicks fledged from 21 nests, an average of 5.43 per nest. The number of chicks that fledged from the unringed nests is unknown.

Ringing and Colour-ringing

The number of chicks ringed in each nest is shown in the Table showing Nest Locations and Outcomes (Appendix 2). The colour-ring combinations are shown in Appendix 3. For completeness, Appendix 3 also includes the colour-ring results from 2019.

One of these 2019 birds (left leg: green over white, right leg: blue over metal), ringed in Jonathan's Hollow, was seen in the next valley, Long Batch, on 17 May 2021.

Nests close together

The pilot project in 2019 found two nests only 87m apart. In 2021, there were two pairs of nests (B1 and B2, and CMV2 and CMV11) within less than 100m of each other, and a cluster of three nests (AH2, AH5 and AH7) spanning only 214m. They were occupied concurrently, and must therefore have belonged to different pairs. This result was unexpected. Pairs in Callow Hollow, monitored on an RSPB survey since 1994, have usually been about 200m apart, and 94% of observations of foraging colour-ringed Whinchats on Salisbury Plain were within 100m of their nest site. The analysis of Whinchat observations in previous years, grouping them into territories, took this into account, and assumed that territories had a radius of about 100m. Thus, some clusters of records, which were each attributed to a single pair, may have contained two. Population estimates made in earlier years may have therefore been slight under-estimates, by around 10%.

Habitat Mapping

The habitats on the Long Mynd were mapped in 1995, and the distribution of Whinchats in 1994-98 was correlated with these habitats. The habitat mapping was repeated in 2017. In the intervening period, the National Trust changed its GIS mapping system, so the 1995 map was re-done to match the 2017 map. The results are shown in Map 4.

The GIS can calculate the area of each habitat enclosed by any of the lines on the maps, and identify the appropriate habitat at the location of any Whinchat nest site or territory.

Habitat Analysis

In previous years, the distribution map has been overlaid on the 2017 habitats map, and the number of Whinchats in each of the various habitats has been calculated, subdivided between the valleys and plateau areas (the thin blue line on the maps). The 2021 results are shown as Map 6. It will be seen that the Whinchat population is concentrated in the higher reaches of the valleys, and on parts of the plateau adjacent to these areas. Large parts of the

area are not occupied, and using the habitat areas for the whole property, and the plateau sub-division, may give a misleading impression of Whinchat habitat choice. A new map has therefore been prepared, showing nine areas enclosing all the Whinchat territories (Map 3). Again, this has been overlaid on the 2017 Habitat map (Map 7). No attempt has been made at this stage to define the boundaries of these areas very carefully, as data only exists for one year, but these areas can be drawn more tightly in future, as criteria emerge from analysis of nests found in the next two years.

The other important management consideration is the exclusion area near watercourses, where no bracken spraying can be carried out. The chemical used, Asulox, is a selective herbicide, which is very effective at bracken control (monitoring has shown that the only significant surviving bracken the following year is where the path of the helicopter has missed areas). The spray does not appear to affect bilberry or heather. It is not an insecticide and is not believed to have any effects on invertebrates. It is not known how long it takes for the bracken to re-grow to its previous density (Andy Perry NT Ecologist, *pers.comm.*). There may be as yet unknown effects on the flora and fauna in the sprayed area. The Whinchat distribution map overlaid on the No-spraying areas is shown in Map 8.

Map 9 shows the Whinchat Occupation Areas overlain on the No-spraying areas.

Maps were also prepared showing the Whinchat distribution map overlaid on the bracken spraying map 2000-19 and bracken cutting map 2015 – 20 (and pre-2007), but these maps show that the number of Whinchats on the spraying and cutting areas is small, so they have not been included.

By comparing the number of nests or territories in each habitat (the breeding density) with the average for the whole area, the preferred habitats can be identified (i.e., there are more Whinchats in those habitats than would occur by chance, the average for the area as a whole). The calculations are shown in the following tables. The preferred habits are highlighted green (excluding habitats covering only a small area, which therefore do not hold many Whinchats).

N.B. The density ratios have been calculated slightly differently than in previous years. The average area occupied by the pairs in each habitat has been divided into the average for the area as a whole, so numbers greater than one indicate a preference, and conversely, numbers less than one indicate that the habitat is avoided.

It should be noted that the location of nests found is known accurately, but the location of the nests in other territories has been estimated, and may therefore contain some inaccuracy in the counts of the different habitats. Therefore, more weight should be placed on the analysis of nest site habitats.

Changes in Habitat and Distribution

In 1994-98, only 19 territories out of the total of 434 territories were on the plateau side of the boundary line (note that all territories found in the six-year period are included, so the territories of most pairs are counted several times). 165 territories (38%) of all Whinchat territories were in bracken with bracken litter understorey on the valley sides, but this was the most widespread habitat. When the densities were calculated, by dividing the area of each habitat by the number of territories in it, then calculating a density ratio by setting the lowest

habitat density at one, and dividing all the other densities by that lowest one, bracken with bracken litter understorey had the lowest density of Whinchat territories (density ratio = 1), and the more favoured habitats were heath with scattered bracken (64 territories, density ratio = 2), bracken with heath understorey (71 territories, density ratio = 1.6), bracken with

Table 2. Whinchat distribution by habitat (Nests found, and other territories), sub-divided into the Plateau area and the steep-sided valleys (Map 6).

Whinchat Nest Sites

Habitat	Plateau				Valleys				Total area			
	Plateau Area ha	Whinchat Nest Sites	Density (area / pair)	Density Ratio	Outside Plateau Area ha	Whinchat Nest Sites	Density (area / pair)	Density Ratio	Total area	Whinchat Nest Sites	Density (area / pair)	Density Ratio
Acid-neutral flush	46.73	1	47	1.9	43.1	3	14	2.8	89.83	4	22.46	2.7
Bracken over grass	73.83			(n/a)	184.9	2	92	0.4	258.73	2	129.37	0.5
Bracken over heath	241.99	11	22	4.0	133.6	6	22	1.8	375.59	17	22.09	2.7
Bracken over litter	20.46			(n/a)	227.09	4	57	0.7	247.55	4	61.89	1.0
Grass with scattered bracken	46.42			(n/a)	5.57		(n/a)	(n/a)	51.99	0	(n/a)	(n/a)
Heath	452.27	1	452	0.2	90.78	2	45	0.9	543.05	3	181.02	0.3
Heath with scattered bracken	265.27			(n/a)	73.56	2	37	1.1	338.83	2	169.42	0.4
Total	1146.97	13	88	1.0	758.6	19	40	1.0	1905.57	32	59.55	1.0

Other Whinchat Territories

Habitat	Plateau				Valleys				Total area			
	Plateau Area ha	Other Whinchat Territories	Density (area / pair)	Density Ratio	Outside Plateau Area ha	Other Whinchat Territories	Density (area / pair)	Density Ratio	Total area	Other Whinchat Territories	Density (area / pair)	Density Ratio
Acid-neutral flush	46.73	1	47	3.1	43.1	4	11	3.4	89.83	5	17.97	3.7
Bracken over grass	73.83	1		(n/a)	184.9	3	62	0.6	258.73	4	64.68	1.0
Bracken over heath	241.99	5	48	3.0	133.6	3	45	0.8	375.59	8	46.95	1.4
Bracken over litter	20.46			(n/a)	227.09	2	114	0.3	247.55	2	123.78	0.5
Grass with scattered bracken	46.42			(n/a)	5.57	3	2	19.5	51.99	3	17.33	3.8
Heath	452.27			(n/a)	90.78	3	30	1.2	543.05	3	181.02	0.4
Heath with scattered bracken	265.27	1	265	0.5	73.56	3	25	1.5	338.83	4	84.71	0.8
Total	1146.97	8	143	1.0	758.6	21	36	1.0	1905.57	29	65.71	1.0

All Whinchat Pairs (Nests and Territories)

Habitat	Plateau				Valleys				Total area			
	Plateau Area ha	Whinchat Pairs	Density (area / pair)	Density Ratio	Outside Plateau Area ha	Whinchat Pairs	Density (area / pair)	Density Ratio	Total area	Whinchat Pairs	Density (area / pair)	Density Ratio
Acid-neutral flush	46.73	2	23	2.3	43.1	7	6	3.1	89.83	9	9.98	3.1
Bracken over grass	73.83	1		(n/a)	184.9	5	37	0.5	258.73	6	43.12	0.7
Bracken over heath	241.99	16	15	3.6	133.6	9	15	1.3	375.59	25	15.02	2.1
Bracken over litter	20.46	0		(n/a)	227.09	6	38	0.5	247.55	6	41.26	0.8
Grass with scattered bracken	46.42	0		(n/a)	5.57	3	2	10.2	51.99	3	17.33	1.8
Heath	452.27	1	452	0.1	90.78	5	18	1.0	543.05	6	90.51	0.3
Heath with scattered bracken	265.27	1	265	0.2	73.56	5	15	1.3	338.83	6	56.47	0.6
Total	1146.97	21	55	1.0	758.6	40	19	1.0	1905.57	61	31.24	1.0

Table 3. Whinchat distribution by habitat (Nests found, and other territories) in the areas occupied by Whinchat shown on Map 3.

Habitat	Areas occupied by Whinchat		Nests found		Other Whinchat Territories		All Whinchat Pairs			
	Area (ha)	Whinchat nests	Density (area / pair)	Density Ratio	Other Whinchat Territories	Density (area / pair)	Density Ratio	Total Pairs	Density (area / pair)	Density Ratio
Acid Grassland	13.1		(n/a)	(n/a)	1	13.1	1.5	1	13.1	0.7
Acid-neutral flush	38.4	4	9.6	1.9	4	9.6	2.0	8	4.8	3.9
Bracken over grass	42.7	2	21.4	0.8	3	14.2	1.4	5	8.5	1.1
Bracken over heath	200.6	17	11.8	1.5	8	25.1	0.8	25	8.0	2.3
Bracken over litter	69.7	4	17.4	1.0	2	34.9	0.6	6	11.6	0.8
Grass (+ heath + scattered bracken)	0.3	0	(n/a)	(n/a)		(n/a)	(n/a)	0	(n/a)	(n/a)
Grass with scattered bracken	27.2		(n/a)	(n/a)	4	6.8	2.9	4	6.8	1.4
Heath	72.8	3	36.4	0.5	3	24.3	0.8	6	12.1	0.8
Heath with scattered bracken	105.8	2	3.3	5.4	4	26.4	0.7	6	17.6	0.5
Total	570.5	32	17.8	1.0	29	19.7	1.0	61	9.4	1.0

Table 4. Whinchat distribution by habitat (Nests found, and other territories) in the bracken No-spray area (Map 8).

No Spray Area		Nests found			Other Whinchat Territories			All Whinchat Pairs		
Habitat	Area (ha)	Whinchat nests	Density (area / pair)	Density Ratio	Other Whinchat Territories	Density (area / pair)	Density Ratio	Total Pairs	Density (area / pair)	Density Ratio
Acid Grassland	18.6		(n/a)	(n/a)	1	18.6	2.4	1	18.6	1.0
Acid-neutral flush	89.0	4	22.3	1.4	4	22.3	2.0	8	11.1	1.7
Bracken over grass	122.0	2	61.0	0.5	2	61.0	0.7	4	30.5	0.6
Bracken over heath	205.0	16	12.8	2.4	4	51.2	0.9	20	10.2	1.8
Bracken over litter	211.1	4	52.8	0.6	2	105.6	0.4	6	35.2	0.5
Grass (+ heath + scattered bracken)	18.4		(n/a)	(n/a)		(n/a)	(n/a)		(n/a)	(n/a)
Grass with scattered bracken	45.1		(n/a)	(n/a)	2	22.5	2.0	2	22.5	0.8
Heath	96.4	2	48.2	0.7	2	48.2	0.9	4	24.1	0.8
Heath with scattered bracken	103.1	1	103.1	0.3	3	34.4	1.3	4	25.8	0.7
Total	908.7	29	31.3	1.0	20	45.4	1.0	49	18.5	1.0

Table 5. Whinchat distribution by habitat (Nests found, and other territories) that occur in both the bracken No-spray area and the Whinchat Habitat areas (Map 6)

Occupation Areas in No Spray Area		Nests found			Other Whinchat Territories			All Whinchat Pairs		
Habitat	Area (ha)	Whinchat nests	Density (area / pair)	Density Ratio	Other Whinchat Territories	Density (area / pair)	Density Ratio	Total Pairs	Density (area / pair)	Density Ratio
Acid Grassland	3.0		(n/a)	(n/a)	1	3.0	6.3	1	3.0	2.5
Acid-neutral flush	38.2	4	9.5	1.3	4	9.5	2.0	8	4.8	1.6
Bracken over grass	33.9	2	16.9	0.7	2	16.9	1.1	4	8.5	0.9
Bracken over heath	135.6	16	8.5	1.5	4	33.9	0.6	20	6.8	1.1
Bracken over litter	65.0	4	16.3	0.8	2	32.5	0.6	6	10.8	0.7
Grass (+ heath + scattered bracken)	1.8		(n/a)	(n/a)		(n/a)	(n/a)		(n/a)	(n/a)
Grass with scattered bracken	9.7		(n/a)	(n/a)	2	4.9	3.9	2	4.9	1.5
Heath	23.5	2	11.8	1.0	2	11.8	1.6	4	5.9	1.3
Heath with scattered bracken	46.6	1	46.6	0.3	3	15.5	1.2	4	11.7	0.6
Total	357.3	29	12.3	2.5	19	18.8	1.0	48	7.4	1.0

heath and grass understorey (30 territories, density ratio = 2.0) and Acid Flush (22 territories, density ratio = 1.8).habitat density at one, and dividing all the other densities by that lowest one, bracken with bracken litter understorey had the lowest density of Whinchat territories (density ratio = 1), and the more favoured habitats were heath with scattered bracken (64 territories, density ratio = 2), bracken with heath understorey (71 territories, density ratio = 1.6), bracken with heath and grass understorey (30 territories, density ratio = 2.0) and Acid Flush (22 territories, density ratio = 1.8).

It will be seen that the proportion of territories on the plateau has increased to 25%, probably reflecting the movement of bracken to the top of the slopes and beyond, creating more of the favoured habitats on the edge of the plateau.

It will be seen that the highest numbers, and highest densities are in bracken over heath. This is a similar result to 1994-98.

The reduction in the number of Whinchats in bracken over bracken litter reflects the reduction in this habitat, as a result of management (bracken spraying). It will be seen from the table with Map 4 that the total of bracken with bracken litter understorey on the steep sided valleys has reduced from 345ha in 1995 to 227ha in 2017, a reduction of 34%. However, the precise figure may not be reliable, because of differences in the two surveys in how surveyors decided to map mosaic habitats, and improvements in technology (aerial photos and GIS software). Also, the surveys do not distinguish between different densities of bracken litter. It is believed that density is increasing. Further work to try and establish the true extent of the changes should be carried out in the remaining years of the project

There are now more Whinchats in bracken over heath in absolute terms, as well as in proportion to the area of available habitat.

Nest site selection

Prior to the Pilot Project in 2019, no attempt had been made to find nests, so all habitat assessment was based on the habitats where other evidence of breeding was observed, using the 16 habitats categories shown on Map 6. It should be noted that “heath” includes both heather and bilberry: there are extensive areas where previous overgrazing has removed all the heather, leaving only short-sward bilberry, while it is not usually possible to observe bilberry in areas where taller heather remains.

This project has specifically recorded the habitat of found nests, using the form in Appendix 4. The pilot project found 10 nests, of which 8 were in bilberry, and 2 in bracken litter.

In 2021, nest finders completed the form at the time the nest was found, and National Trust staff revisited the nests in July and August, when the habitats (particularly emerging bracken) would be more visible.

The habitat where the nest was built was recorded for 39 out of 40: 27 (69%) were in bilberry, 5 (13%) were in moss, 5 (13%) were in bracken litter, and 2 (5%) were in grass. The recording form was annotated in 12 instances, indicating that these nests in bilberry were actually built into moss under the bilberry. This might have also been true for more of the nests, as it was not included as a tick-box option for the surveyors to use, and the recording form will be amended for 2022 to determine the number of nests in moss under bilberry (and in moss or other ground-vegetation beneath the bracken). This highlights the importance of bilberry for within the “heath” habitat. No nests were built in heather, and it occurred close to nests in only one-quarter (25%) of cases.

Eight of the 40 nests failed, but relay nests were found for them. Of these, five re-laid in the same vegetation (bilberry), one moved from bracken litter to bilberry, one moved from bilberry to grass, and one moved from moss to grass.

Other vegetation recorded very close to the nest included bracken (14 cases, 36%), bracken litter (13, 33%), grass (12, 31%), heather (10, 26%) and moss (3, 7%).

The vegetation within 10m of the nests was noted. Bilberry was recorded at 37 of the 39 sites, bracken or bracken litter was recorded at 33, grass at 30. Heather at 24, moss at 8, bare ground at 8 and rushes at 1.

Within a radius of 100m (the foraging territory), bracken litter was recorded at 33 (86%) out of 38 sites (and bracken was present at three of the other five), bilberry, heather and grass were also present at almost all of the sites (35 (92%), 33 (87%) and 37 (97%) respectively), and rushes were present in just over half (21 – 55%).

Estimating the proportion of each vegetation type in the field is difficult, so nest-finders made a rough DAFOR assessment – whether each habitat was Dominant, Abundant, Frequent, Occasional or Rare in each territory. The results for all 40 territories are shown in Table 6.

It will be seen that Bracken comprises more than 50% of the habitat in half the territories. However, this data was collected at the time the nest was found, before the end of May in more than half the cases, before the main growth period of the bracken. The data collected in the late summer visit shows that bracken comprises more than 50% of the habitat in 35 (90%) of the territories, and more than one-quarter in the remaining four (see Table 7). This confirms the observation made following previous Breeding Bird Surveys, that Bracken

occurs in all Whinchat territories, but highlights for the first time that bilberry rather than heather is important within the heath, with it being over 50% of the territory area in half the territories (although it appears a few of the forms have not been filled in accurately).

Table 6. Territory habitat (DAFOR at c.100m) when nest found

Proportion	%	Number of territories in each habitat category						
		Bracken (summer)	Litter	Bracken (all)	Grass	Heather	Bilberry	Rushes
D - Dominant	>75	5	5	10	2	0	7	0
A - Abundant	51 – 75	7	3	10	3	3	16	1
F - Frequent	26 - 50	6	12	9	3	6	4	4
O – Occasional	11 - 25	4	6	3	17	15	8	6
R – Rare	1 - 10	2	9	5	12	9	2	8
Total		24	35	37	37	33	37	19

Table 7. Territory habitats (DAFOR at c.100m) on late season visit

Proportion	%	Number of territories in each habitat category						
		Bracken (summer)	Litter	Bracken (all)	Grass	Heather	Bilberry	Rushes
D - Dominant	>75	19	2	19	0	1	7	0
A - Abundant	51 – 75	16	1	16	0	1	11	0
F - Frequent	26 - 50	4	4	4	2	6	11	3
O – Occasional	11 - 25	0	6	0	12	10	8	3
R – Rare	1 - 10	0	26	0	25	20	2	19
Total		39	39	39	39	38	39	25

The complete habitat vegetation data is shown in Appendix 5.

The elevation of 35 of the nests was recorded, with a range from 309m to 465m, average 422m.

The nearest water was recorded in 34 cases. It was usually a stream, but in 13 (%) cases it was a wet flush. The distance varied between 1 and 250m, average 43m, but only two were greater than 100.

The nearest tree was recorded for 37 nests. The closest was 8m, the furthest was 250m, and the average 73m. Eleven nests had no tree within 100m. The average number of trees within 100m of the other 26 nests was 5, and the maximum number was 5 trees.

The aspect and gradient of the slope containing the nest were recorded in 37 cases. One was judged to be on flat ground, 20 had a southerly aspect, three were west or east, and 13 had a northerly aspect. The aspect is summarised in Table 8, from the north, in compass point order.

The angle of slope varied between 0 and 60 degrees, average 26 degrees. Thirteen were between 0 and 15 degrees, 12 between 20 and 30 degrees, and 12 over 30 degrees.

Elevation, distance to water and trees, and orientation and angle of slope, in shown in Appendix 6.

Table 8. Aspect of slopes with nests

Aspect	Count
N	3
NNE	1
NE	2
E	2
SE	6
SSE	2
S	5
SSW	4
SW	3
W	1
NW	2
NNW	5
na	1
Total	37

Bracken management in 2021

Management to control bracken can only be carried out effectively, by cutting or spraying, while it is still growing strongly (i.e., in the late summer). No spraying was carried out in 2020 or 2021.

The National Trust agreed with the graziers to cut “gathering strips” for sheep by early August 2021, and intended that the bracken management proposals from this project should be considered and implemented at the same time.

A new machine, a “robocutter”, which can cut thick bracken with dense bracken litter understory and operate on steep slopes, can be used to cut the bracken. This gives the option of bracken management in the No-spray areas.

A preliminary report, “Whinchat Distribution and Bracken Management 2021” was produced to facilitate discussion with the Trust on work to be carried out in August 2021. This report included draft versions of

- Whinchat nests and territories (All Pairs, Map 2)
- The Habitat Analysis in relation to the Habitats map, the No-spraying areas, and the Whinchat Occupation Areas (an earlier draft of the relevant sections of this report).

It will be seen that just over half the nests found were in Bracken over Heath, and almost one-third of the smaller number of territories were in the same habitat. The density of Whinchats is highest in the Acid-neutral flush, followed by Bracken over Heath.

Bracken over Bracken Litter does not appear to be a favoured habitat, and the densities are generally much lower than in Bracken over Heath.

Not surprisingly, because Whinchats need water (a stream or a flush) in their territory, the vast majority (29 out of 32 nest sites, and 20 out of 29 territories, total 49 out of up to 61 – 80%) occur in the No-spray area. Large parts of the No-spray area are in the lower valleys, where there are no Whinchat. Combining the No-spray area map and the Whinchat Occupation areas map (Map 6) produces the most useful data, in Table 4. Bracken management should be concentrated in the No-spray area in the areas occupied by Whinchat.

The provisional conclusions of this discussion were that habitat management in 2021, should not be done around the nest sites themselves - there may be factors that make 2021 distribution atypical, so we should have two years data before considering that.

It was therefore agreed to

- i. cut around but into the edges of the bracken + bracken litter in areas that are within both the Whinchat Occupation Areas and the No-spray areas (Map 9) to reduce the area of the bracken litter, and create a buffer zone to prevent the spread of the thick bracken into the preferred habitat of bracken over heath. The surveys of the habitat around the 2021 nest sites showed that, within “heath”, bilberry is being selected rather than heather, so this cutting should concentrate on safeguarding the bilberry from encroachment by bracken litter.
- ii. to trial cutting strips and crosses into the bracken litter, as this is likely to provide shelter from the elements for foraging Whinchat, and increase the supply of invertebrate food. This should be near the Whinchat Occupation Areas, and within the No-spray areas (i.e., within 50m of a watercourse or flush), within the Whinchat altitude range of 309-465m.
- iii. record accurately all areas that are cut, and map them in GIS, to monitor distribution of nests in relation to managed areas from 2022 onwards.

Only three small trial areas specific to this project (point ii) above) were actually cut in 2021, totalling 0.15ha, shown on Map 10. No cuts were made with respect to point i), but the contractor did cut a lot of gathering strips, which will also serve as useful trials.

Cutting only weakens the bracken, which will start to grow back the following year, but fronds will be fewer and shorter. This effect is more pronounced after repeatedly cutting the same areas every year, so this must be undertaken if the management is to have any long-term benefit.

The height of the cutting blade should be set to reflect the vegetation being cut. If the understorey is bilberry, the blade should be set 20cm or more above the ground (the actual height of the bilberry present), to avoid damage to the bilberry roots, and facilitate rapid recovery. This will also benefit any heather and other ground vegetation present. If the understorey is bracken litter, the blade should be set as low as possible, as removing the bracken litter should help other species (grass, bilberry and heather) to colonise. The aim should be to increase the diversity of the ground-layer vegetation.

Productivity

Nests of 32 pairs were found, and 24 produced fledged young. Three of these were unringed. Twenty-three nests were ringed but two are known to have been predated. Assuming that all ringed chicks in the successful nests fledged, then 114 chicks fledged from 21 nests, an average of 5.43 per nest. The number of chicks that fledged from the unringed nests is unknown.

For the population to be stable, the number of birds joining the breeding population each year (the survivors from the fledged young in the previous year) must be at least equal to the number of adult birds dying off. Bird Facts data on the BTO website states that Whinchats breed at one year old, the survival rate for juveniles (the proportion of fledged young that survive to breeding age) is 0.34, and after that the adult annual survival rate is 0.43.

With this data, it is possible to construct a simple population model, shown in Appendix 7. This shows that the productivity of the 2021 population is theoretically sufficient to sustain the population, assuming that the productivity of the three found nests that had fledged young that were not ringed, and that of the nests of the other estimated 29 pairs that were not found, was similar.

Project results in 2022 and 2023 will indicate whether 2021 results, and the conclusions from them, are typical. Consideration should also be given to whether there are any reasons why the productivity of the unfound nests might be different from the found nests.

The colour-ringing is intended to establish the rate of return of the fledged young, and confirm the model. It predicts that 39 colour-ringed birds will return in 2022. In practice, the situation will be more complex, as it assumes that all adults that fledged from nests on Long Mynd will return here (i.e., there is no immigration or emigration).

What we learnt, and changes to the project

Although the planning assumption that it would be easiest to find nests before incubation started (i.e., in the period 17-27 May) was correct, less than half the nests were found in that period. Eight pairs failed and re-laid, and if the relays had not been found, breeding success would have been under-estimated, potentially compromising a major objective of the project. Nest-finding must continue over the period 17 May – 21 June, and the budget for nest-finding must be significantly increased.

Two broods are known to have been predated after ringing, but most were not rechecked because of the danger of broods “exploding” (leaving the nest prematurely, before they could fly, to avoid potential predators). Broods are theoretically at their most vulnerable to predators just before fledging, as they might be heard begging for food, and adults need to visit the nest with food more frequently. Cameras and thermacrons help monitor the nests at this important time, but need to be supplemented with a visit to each nest site just after the anticipated fledge date to confirm that the young did fledge.

The Habitat recording form for Whinchat nest sites (Appendix 4) should be revised,

- Bilberry and Moss should be added to Q1, together with what if anything the Moss is under
- Add new questions - Distance to sheep track and human footpath

More precise guidance should be given to nest finders to ensure the form is completed fully, and consistently.

Cameras were deployed on 19 of the 40 nests. Some sites were too public, and any deployed camera would have been at risk. Those that were deployed were often obstructed by growing vegetation. However, it is important to improve knowledge on potential predators, and absence of recording of large predators is itself helpful. The cameras provided some useful data, but deployment should be reviewed, to try and improve their coverage.

A new system of nest markers should be devised, as several nests could not be found on the summer visit because canes were no longer present (or visible).

Nest-finders must also record pairs with nests that they do not find, to help assess the total population.

Every Whinchat needs to be checked for colour-rings. A record must also be made of those that are not ringed, to establish the proportion that are ringed

Survey work in previous years found Whinchats in the upper reaches of the steep sided valleys, and it was only when fledged young have been out of the nest for several days that family parties ventured onto the plateau. The Long Mynd maps have the boundary between the steep-sided valleys and the plateau marked on them (blue line). Surprisingly, one-third (13 out of 40) of the found nests were on the plateau side of this line. The mapping observation is confirmed by the nest site analysis, which shows that 13 of the found nests were on a shallow slope with a gradient of 15 degrees or less. Most of the other found nests were towards the top of the steep slopes, and we will monitor in future years whether nest site selection favours close proximity to the levelling off of the steep sides.

The reduction in the area of bracken with bracken litter understorey since 1994-98, as a result of aerial spraying with herbicide, has been accompanied by an apparent shift in the distribution of Whinchats into bracken over heath. This needs to be confirmed by work in future years, perhaps including a recalculation of the habitat areas on the plateau and the valley sides consistent with the methodology of the 2017 habitat survey, and a slight reworking of the 1994-98 data to remove annual recounting of the same favoured territories.

No attempts have been made to find nests in any years before 2019, so the results of the pilot project (8 nests in bilberry, 2 in bracken) and in 2021 (69% of nests found were in bilberry), which highlight the importance of bilberry, and heath in the bracken, is also new information.

The findings in the previous paragraphs suggest that the objectives of the three-year *Our Upland Commons* project, to break up the dense bracken (that with the bracken understorey) for the benefit of both Whinchat and commoners (sheep graziers), will benefit Whinchat.

They also suggest that the feared deterioration of the bracken habitat (an increase in the bracken litter understorey) has not occurred.

Several comments on the draft report suggested additional issues to consider, including whether the nests found were representative of all the nests. These comments will be taken into account when revising the Recording Form for nests (Appendix 4), to ensure the necessary information is collected. When we have three years of data, it will be possible to analyse nest survival rates and habitat use more fully, and publish the results in scientific journals.

Comparison of the results of this project with research elsewhere

On Salisbury Plain, out of the 199 monitored nests in the three seasons 2012-14, 69.4% failed to fledge any young. The majority of nest failures were attributable to predation (89.1%), desertion at the egg (7.25%), or nestling stages (2.17%), and 1.45% were run over by military Vehicles. Nocturnal predation was very high (73% [n = 49] of these predation events occurred between sunset and sunrise), and even after relays only about a third of nests survived to fledge. It is believed that this was because the undisturbed habitat and lack of any predator control on Salisbury plain attracts many predators, mainly badgers and foxes (Taylor et al (2015), Jenni Border pers.comm.). Breeding success for 40 nests by 32 pairs in this study was considerably higher.

Several studies have concluded that availability of suitable habitat does not appear to be a limiting factor on the Whinchat population (i.e., there is a considerable amount of unoccupied suitable habitat). Work on Long Mynd supports this view. The population has declined considerably since 1994-98, with a substantial contraction of range, but the habitat has been improved, with a reduction in bracken with litter understorey by spraying, and a reduction in sheep grazing.

This has been achieved through an Environmentally Sensitive Area (ESA) Agri-environment agreement between 1999 and 2010 between The National Trust, Natural England and the Commoners with grazing rights, which was replaced by an Environmental Stewardship Higher Level Scheme (HLS) agreement when the ESA ended.

In the current HLS scheme, there can be a maximum of 3740 ewes with 935 followers (lambs) and 20 ponies. Sheep counts show that sheep are generally under the maximum (but ponies are usually over). Numbers were far higher prior to 1999, with a count of 12000 ewes plus 5000 lambs, and old photos show the impacts of heavy grazing, which are no longer evident.

The National Trust is under increasing pressure from the commoners to limit the impact of the spread of bracken on the available sheep grazing, but it should be noted that the area covered by the most dense bracken has been considerably reduced by spraying, but at least one Whinchat nest was lost to disturbance or trampling by sheep

It will be seen from the distribution maps overlain on the various habitat maps that there are large areas of habitat similar to the occupied areas that no longer support Whinchat.

Proposed research on Bracken habitats

Murray et al. (2016) found that Whinchat were less likely to forage in areas with greater bracken cover and suggested that this was due to it being a poor foraging habitat, supporting low food abundance and influencing prey availability.

Research at RSPB Geltsdale has suggested that the diversity of vegetation at the ground layer is the most significant feature [for Whinchat breeding density]. This can be affected by bracken, and grazing. The bracken almost certainly physically inhibits grazing, increasing the ground flora diversity. This is dependent on the density of the bracken, but having carried out a great deal of vegetation monitoring in bracken at Geltsdale, there were surprisingly few plots with bracken so dense there was no ground vegetation layer (Mike Shurmer, RSPB *pers.comm.*).

The habitat mapping on Long Mynd has already shown a variation in Whinchat density in bracken habitats according to the ground-level vegetation. It is therefore necessary to measure food abundance in the different habitats (including heath with and without bilberry), and assessing whether the proposed method for bracken management in the No-spray areas (cutting strips and crosses in the bracken with bracken litter understory) leads to an increase in invertebrate food. It is also necessary to measure food abundance in sprayed areas, to see how long the benefits of spraying last.

It is likely that this research will confirm the importance of bilberry, as it is an indirect food source at the crucial time, when Whinchat chicks are being fed in the nest. Bilberry flowers in May-June, attracting invertebrates, while heather flowers in July and August, and bracken not at all.

These issues will be given further consideration, and a research proposal will be put forward for funding by OUC and National Trust.

Whinchats on other Commons

Whinchats breed on several of the 12 commons in four parts of the country (Yorkshire Dales, the Lake District, Dartmoor and the Shropshire Hills) involved in the *Our Upland Commons* project. The spread of bracken is an issue on some of these commons too.

During the Development phase of the OUC project, contact was made with fieldworkers or site managers on several of the other 11 commons to discuss the possibility of complementary work on Whinchats elsewhere.

This report should be supplied to the OUC management teams in the other areas by the OUC Shropshire Hills Project Officer, and to the people contacted during the Development Phase by the Project Co-ordinator to raise again the possibility of complementary project work.

RSPB is starting an OUC-funded Whinchat Project on Dartmoor in 2022, for one field-season, to examine habitat characteristics in areas that have either lost or retained Whinchat since 1979.

Acknowledgements

The nest finding and monitoring was led and co-ordinated by Martyn Owen of BiOME Consulting. The nest finders were Tom Griffin, Jonathan Groom, Mick Hayhurst, Phil James, Andy Spencer, David Stafford and David Woodhouse. Martyn set up the Google Drive spreadsheet for all data entry by the nest finders and ringer, and Jonathan Groom added further data.

The colour-ringing was carried out by Andy Spencer, under the auspices of Stephen Westerburg, warden of RSPB Geltsdale, who has been colour-ringing Whinchats for many years. He provided the colour-ring combinations that Andy was allowed to use. All the nest finders helped Andy Spencer on a voluntary basis, including taking him to nests, and helping carry the equipment.

Volunteers conducting the Breeding Bird Survey (Isabel Carter, Barbara Daniels, Gill Davies, Bernard Ford, Ron Parnell, Dave Pearce, Leo Smith, Dave Stafford, Mark Underwood and Dick Ward) recorded Whinchats in almost all parts of the Long Mynd. Dick Ward compiled the LMBBS Whinchat records into a single spreadsheet, which Debby Santry, National Trust GIS Officer, used to compile the All Pairs 2021 map.

Andy Perry, National Trust ecologist, produced the habitat recording form. The nest finder completed it when each nest was found, and National Trust staff (Peter Carty and / or Charlie Bell) re-visited the found nest sites to complete it again.

Advice was provided by

- Jennifer Border (nee Taylor), who carried out a Whinchat nest finding and monitoring project on Salisbury Plain, and who now works for BTO.
- Stephen Westerburg, warden of RSPB Geltsdale, who has been colour-ringing Whinchats since 2011.
- Andy Perry, National Trust ecologist for the Long Mynd at the start of the project
- Mike Shurmer, Head of Species (England) and Andrew Stanbury, lead Whinchat researcher, of RSPB

Debby Santry, National Trust GIS Officer, produced all the maps and habitat data in the report.

Special thanks are due to the Shropshire Hills AONB Trust and their Conservation Fund, which provided 50% of the funding for the 2019 Pilot Project. That project could not have been carried out without this funding, and we learnt a considerable amount from it, which contributed greatly to the content of the Delivery Phase project proposal in Appendix 1. Without the AONB Trust's initial financial support, and the work of Stephanie Hayes (Shropshire Hills AONB Partnership Promotions Officer) this project would have been far less successful.



Comments on the first draft of this report were provided by Simon Barker, James Grundy, Andrew Perry, Mike Shurmer, Andy Spencer, Andrew Stanbury and Renee Wallace.

The project was managed and co-ordinated by Leo Smith Ornithological Surveys and Consultancy.

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References

Cramp, S (ed) 1988 *The Birds of the Western Palearctic (Volume 5 - Whinchat)* Oxford University Press

Border, Jennifer A.; Henderson, Ian G.; Redhead, John W.; Hartley, Ian R. 2017. *Habitat selection by breeding whinchats *Saxicola rubetra* at territory and landscape scales*. Ibis, 159 (1). 139-151

John Calladine & David Jarrett (2021): *Upward elevational shift by breeding Whinchat *Saxicola rubetra* in response to cessation of grazing in upland grassland* Bird Study, DOI: 10.1080/00063657.2021.196321

Christopher Murray, Jeroen Minderman, James Allison & John Calladine (2016) *Vegetation structure influences foraging decisions in a declining grassland bird: the importance of fine-scale habitat and grazing regime* Bird Study, 63:2, 223-232, DOI: 10.1080/00063657.2016.1180342

Andrew J. Stanbury, · Irena Tománková, · Emma L. Teuten, David J. T. Douglas (2021) *No evidence that declining Whinchat *Saxicola rubetra* are currently limited by the availability of apparently suitable breeding habitat within the UK uplands* Journal of Ornithology <https://doi.org/10.1007/s10336-021-01925->

Taylor, Jennifer A; Henderson, Ian G.; Hartley, Ian R. (2015) *Breeding Whinchats (*Saxicola rubetra*) on Salisbury Plain: Evidence that carrying capacity is not currently limited by habitat or food availability*. In: Bastian H-V, Feulner J (Eds.): *Living on the Edge of Extinction in Europe*. Proc. 1st European Whinchat Symposium: 211-218. LBV Hof, Helmbrechts.

Conclusion

The first year of the three-year project has been successfully concluded.

Many more nests were found than the target (40 rather than 30), and finding 8 relay nests after pairs lost their first clutches has led to increased understanding of breeding success and productivity.

Habitat monitoring at nest sites has highlighted the importance of bilberry.

The chicks in almost all of the successful nests were ringed, and the numbers have shown that, in 2021 at least, the number of fledged young is more than sufficient to sustain the population.

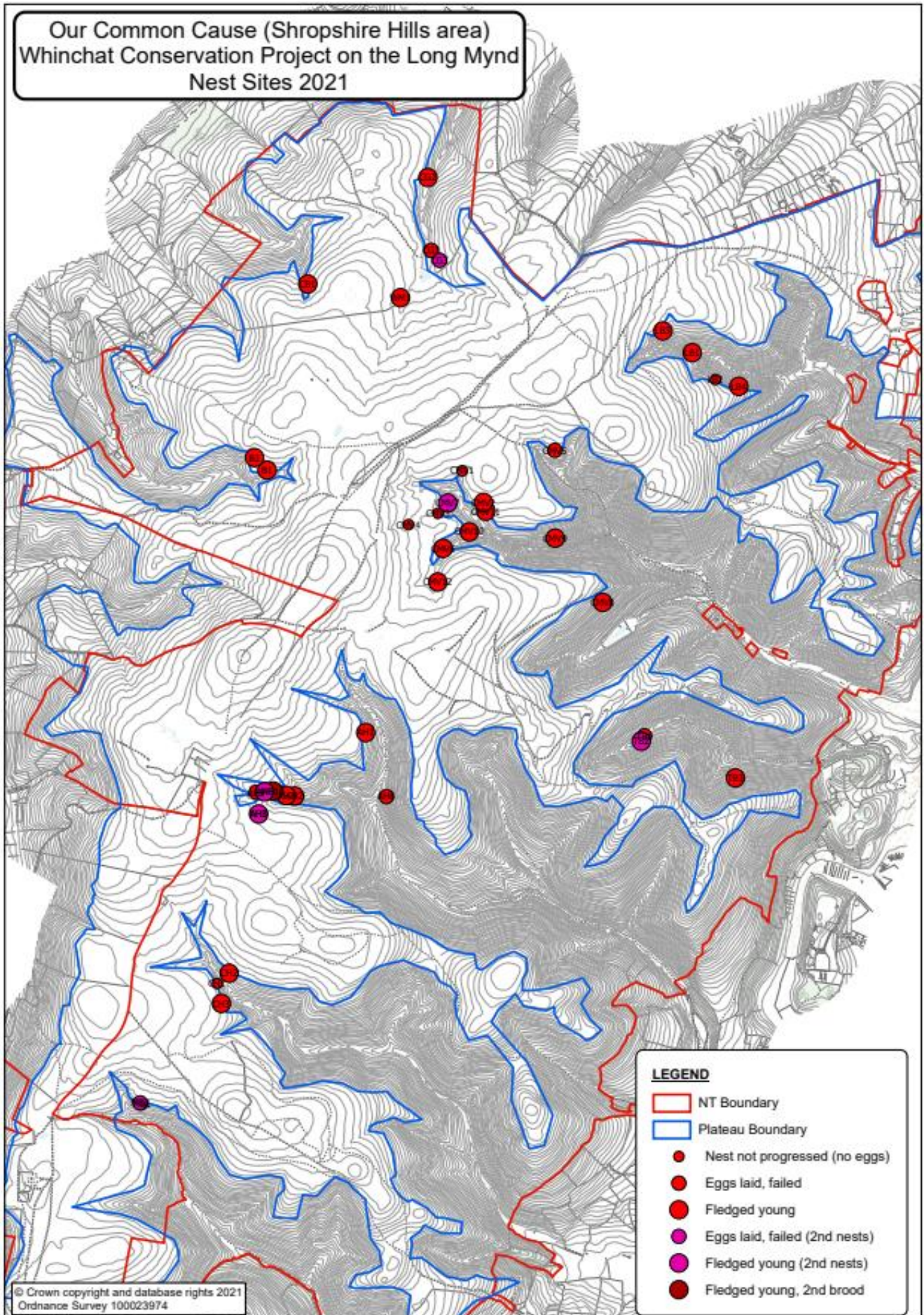
Initial results confirm the assumptions behind the initial proposal, that bracken with bracken litter understory is not favoured by Whinchat, and management to break up the dense areas of this habitat will be helpful. This needs to be tested by a new complementary research project into the food availability in the different bracken habitats, and the long-term effectiveness of bracken spraying.

It is vital that years two and three of the project build on this initial success.

Leo Smith
Leo Smith Ornithological Surveys and Consultancy
Project Manager and Co-ordinator
January 2022

Map 1. All 40 nests found 2021

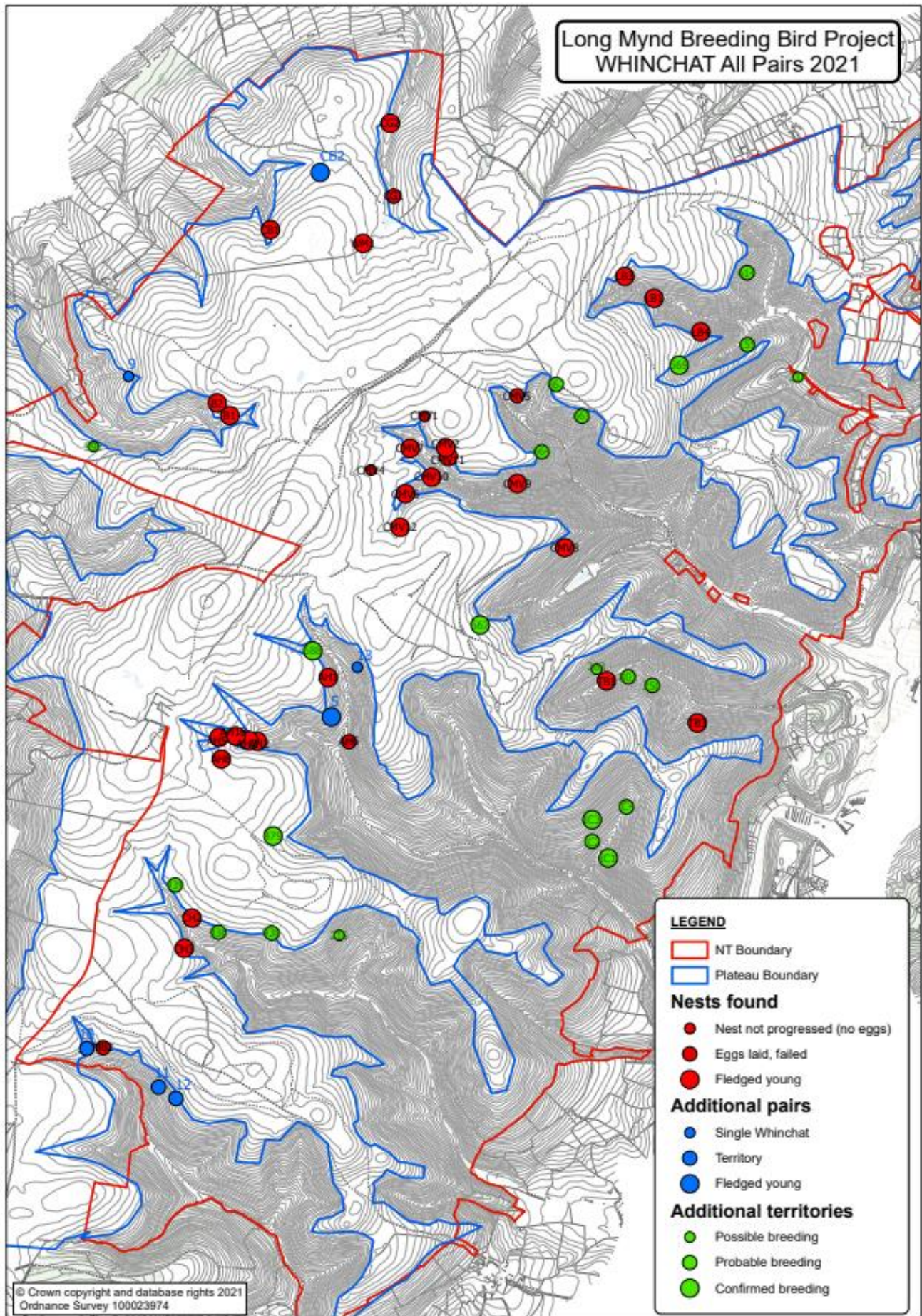
The blue line marks the approximate boundary between the steep-sided valleys and the plateau.



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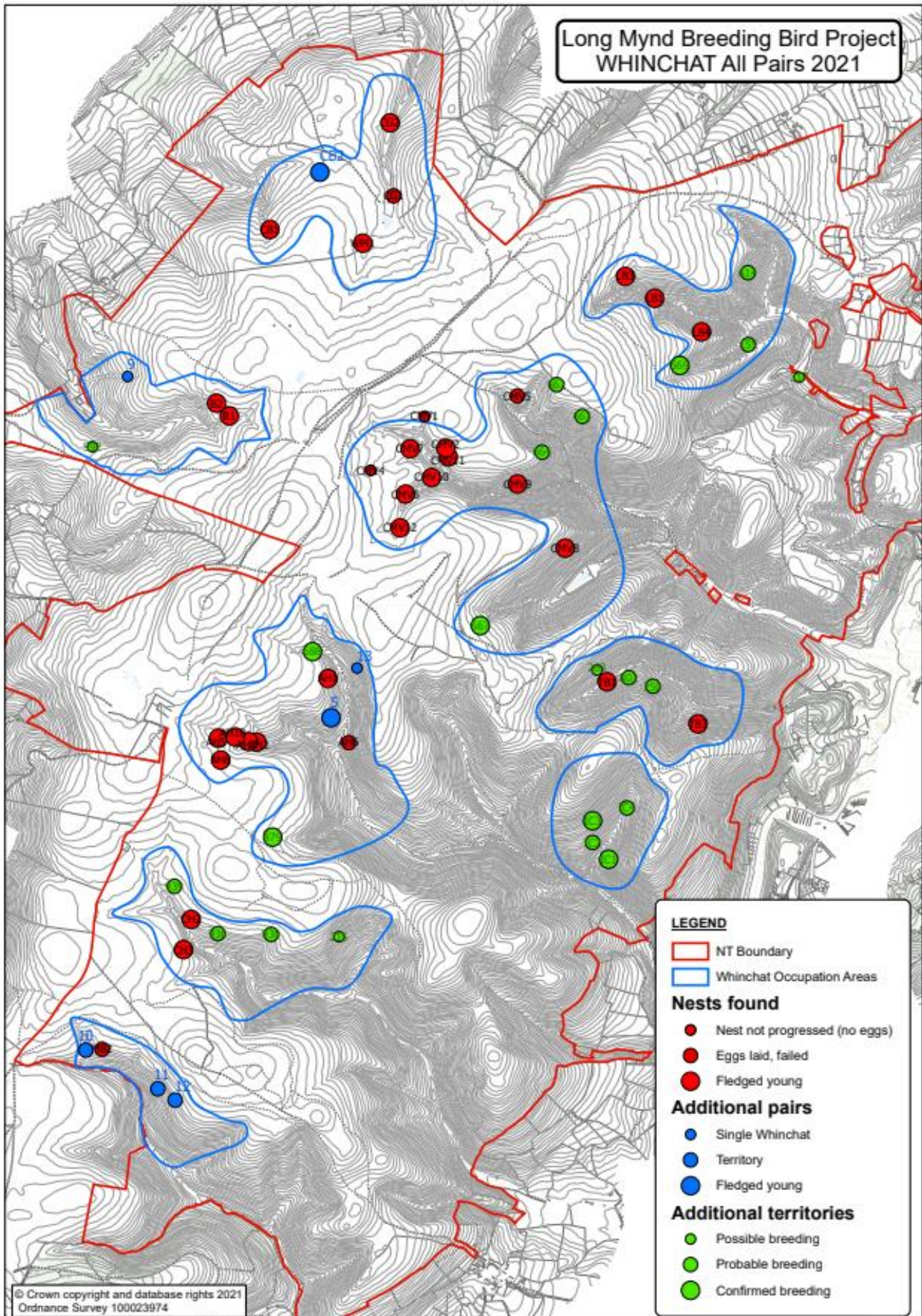
Map 2. Distribution of All Whinchat Pairs 2021

Each pair appears once only, nests of 32 pairs in red, additional pairs located by the Breeding Bird Project volunteers in green, and additional observations by nest finders in blue.

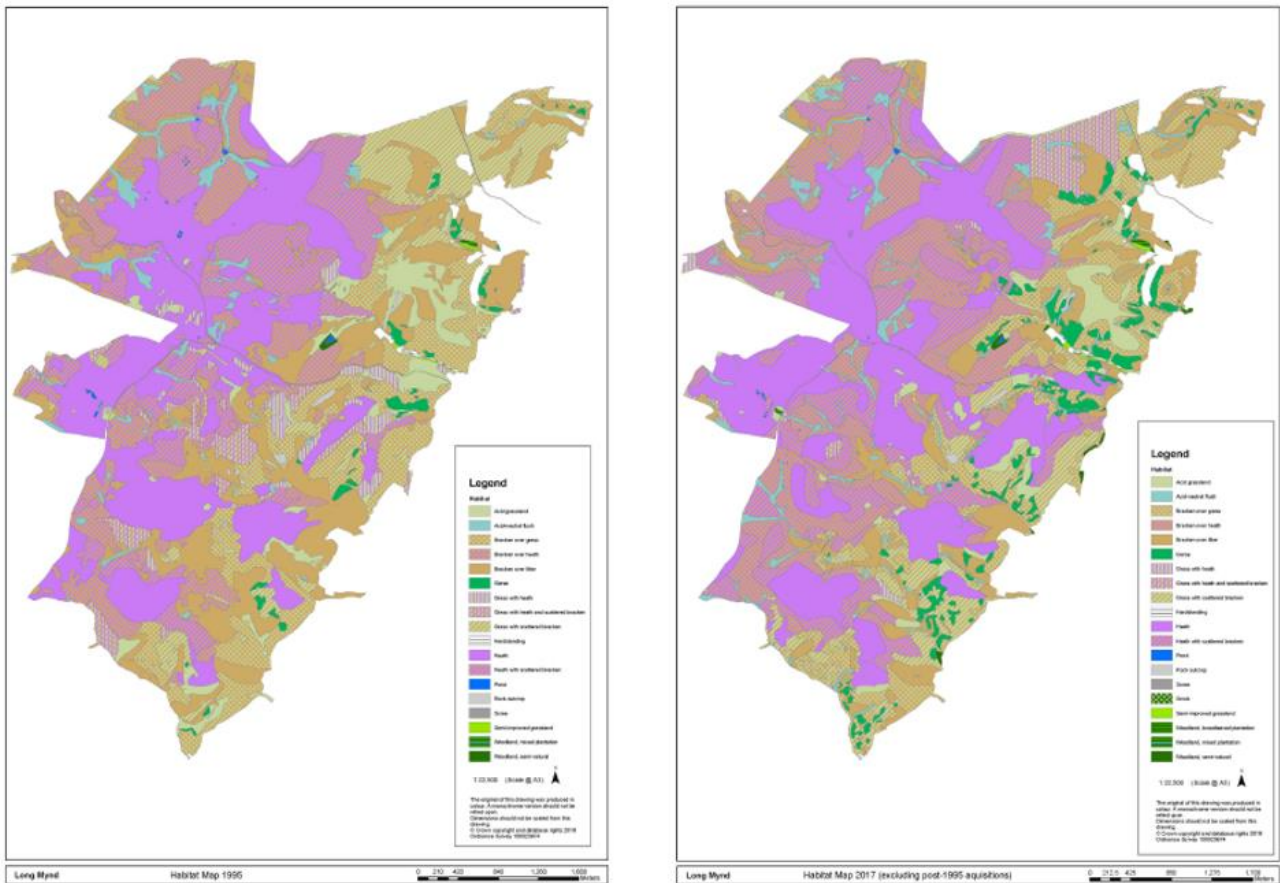


Map 3. Discrete areas occupied by Whinchat Pairs 2021 (the “Occupation Areas”)

Each pair appears once only, nests of 32 pairs in red, additional pairs located by the Breeding Bird Project volunteers in green, and additional observations by nest finders in blue. The blue lines enclose the different “occupation areas”.



Map 4. Long Mynd habitat maps: 1995 (left) and 2017 (right)

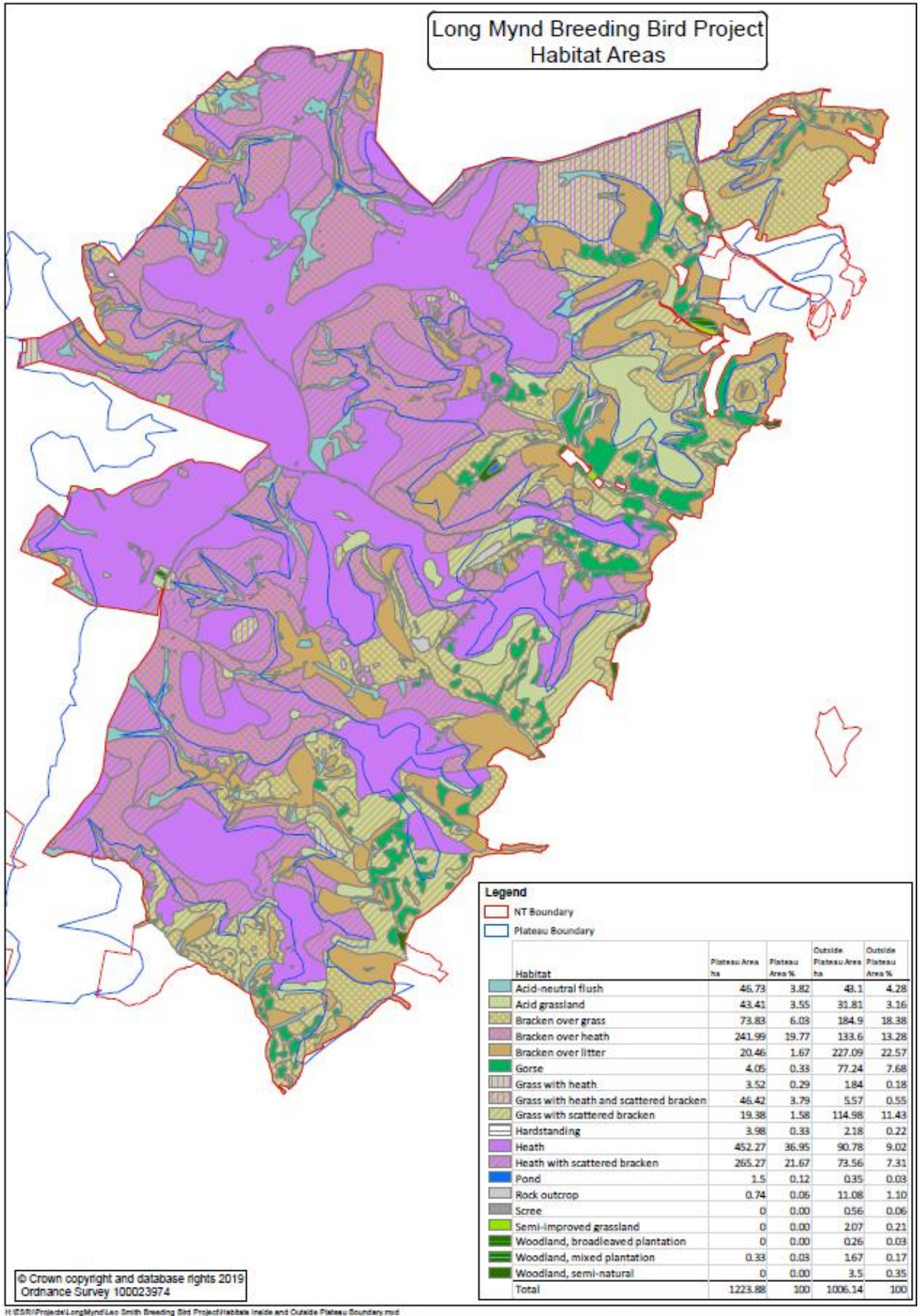


Bracken has moved up the hill, but proportion of dense bracken reduced by spraying

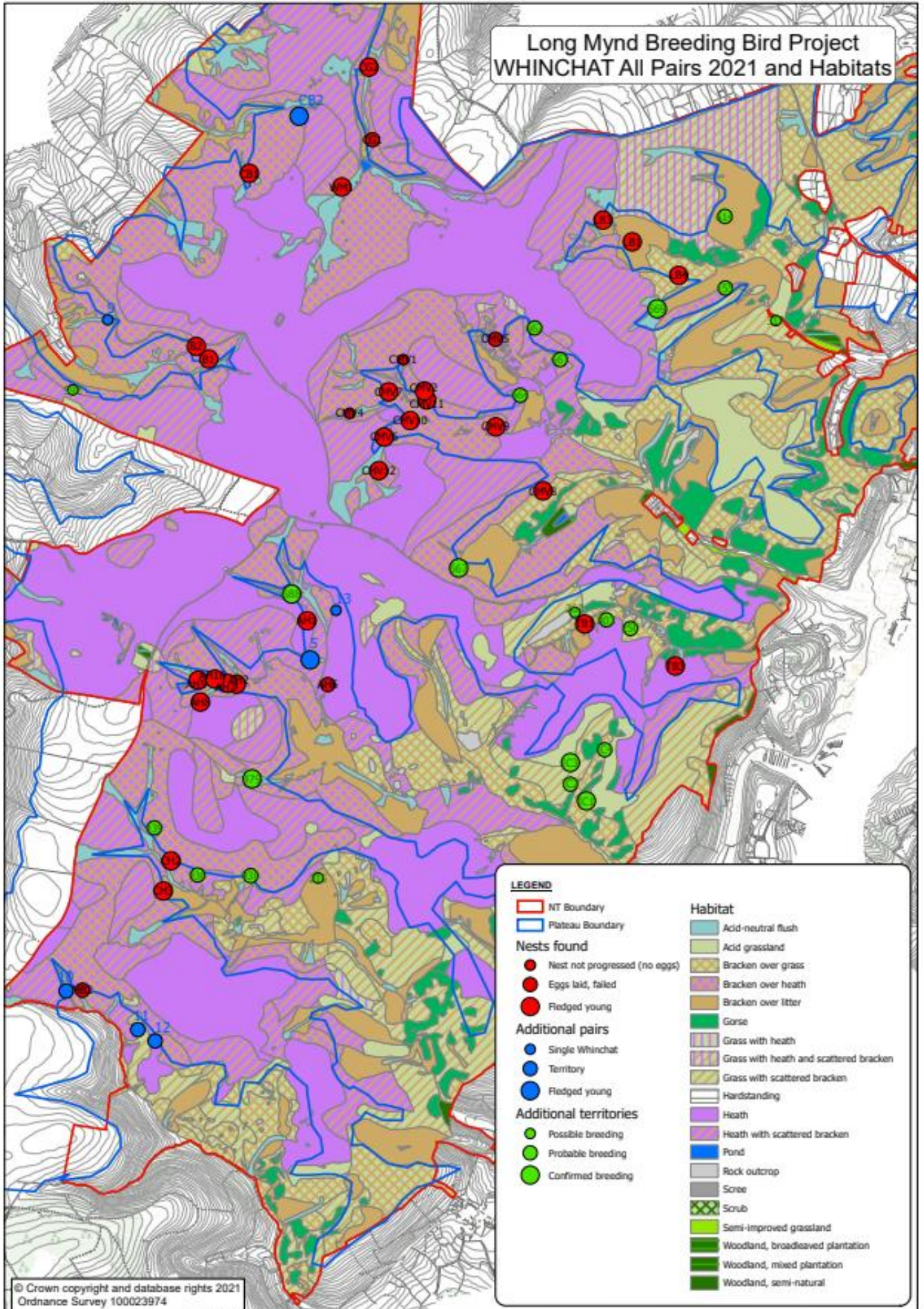
The area and percentage of the different habitats from the 1995 and 2017 surveys is shown in the table below. Note that the earlier figures were calculated at the time, and have not been re-calculated following the revision of the 1995 map to be consistent with the 2017 map.

Habitat	1995				2017			
	Plateau Area ha	Plateau Area %	Valleys Area ha	Valleys Area %	Plateau Area ha	Plateau Area %	Valleys Area ha	Valleys Area %
Acid grassland					43.41	3.5	31.81	3.2
Acid-neutral flush	35.3	2.9	25.9	2.7	46.73	3.8	43.1	4.3
Bracken over bracken litter	87.1	7.3	344.9	36.4	20.46	1.7	227.09	22.6
Bracken over grass	46.1	3.8	193.6	20.4	73.83	6.0	184.9	18.4
Bracken over heath and grass	15.0	1.2	31.4	3.3				0.0
Bracken over grass understory	187.8	15.7	93.3	9.8	241.99	19.8	133.6	13.3
Gorse	0.6	0.0	20.0	2.1	4.05	0.3	77.24	7.7
Grass	39.1	3.3	43.9	4.6				0.0
Grass with heath	4.4	0.4	13.8	1.5	3.52	0.3	1.84	0.2
Grass with heath and scattered bracken	1.9	0.2	0.8	0.1	46.42	3.8	5.57	0.6
Grass with scattered bracken	69.1	5.8	33.1	3.5	19.38	1.6	114.98	11.4
Hardstanding					3.98	0.3	2.18	0.2
Heath	462.3	38.5	64.4	6.8	452.27	37.0	90.78	9.0
Heath and grass	11.4	1.0	9.0	0.9				0.0
Heath with grass + scattered bracken	12.2	1.0	7.3	0.8				0.0
Heath with scattered bracken	214.5	17.9	66.2	7.0	265.27	21.7	73.56	7.3
Pond	2.0	0.2	0.7	0.1	1.5	0.1	0.35	0.0
Recent Burn	11.3	0.9	0.1	0.0				0.0
Rock outcrop					0.74	0.1	11.08	1.1
Scree					0	0.0	0.56	0.1
Semi-improved grassland					0	0.0	2.07	0.2
Woodland, broadleaved plantation					0	0.0	0.26	0.0
Woodland, mixed plantation					0.33	0.0	1.67	0.2
Woodland, semi-natural					0	0.0	3.5	0.3
	1199.9	100.0	948.5	100.0	1223.88	100	1006.14	100

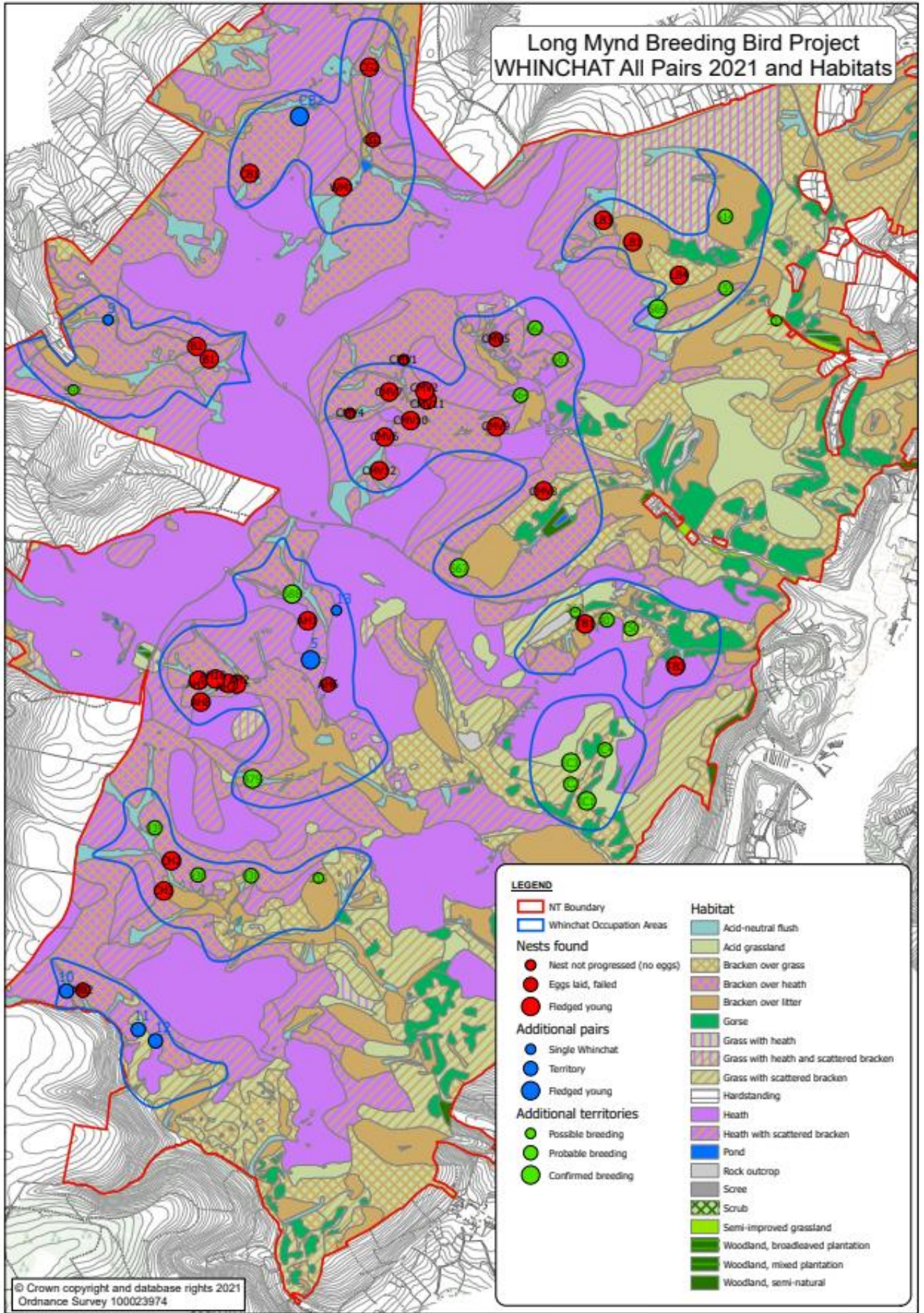
Map 5. 2017 Habitat Map, showing boundary between the plateau and valleys



Map 6. All pairs 2021 on the 2017 Habitat Map, with the plateau boundary

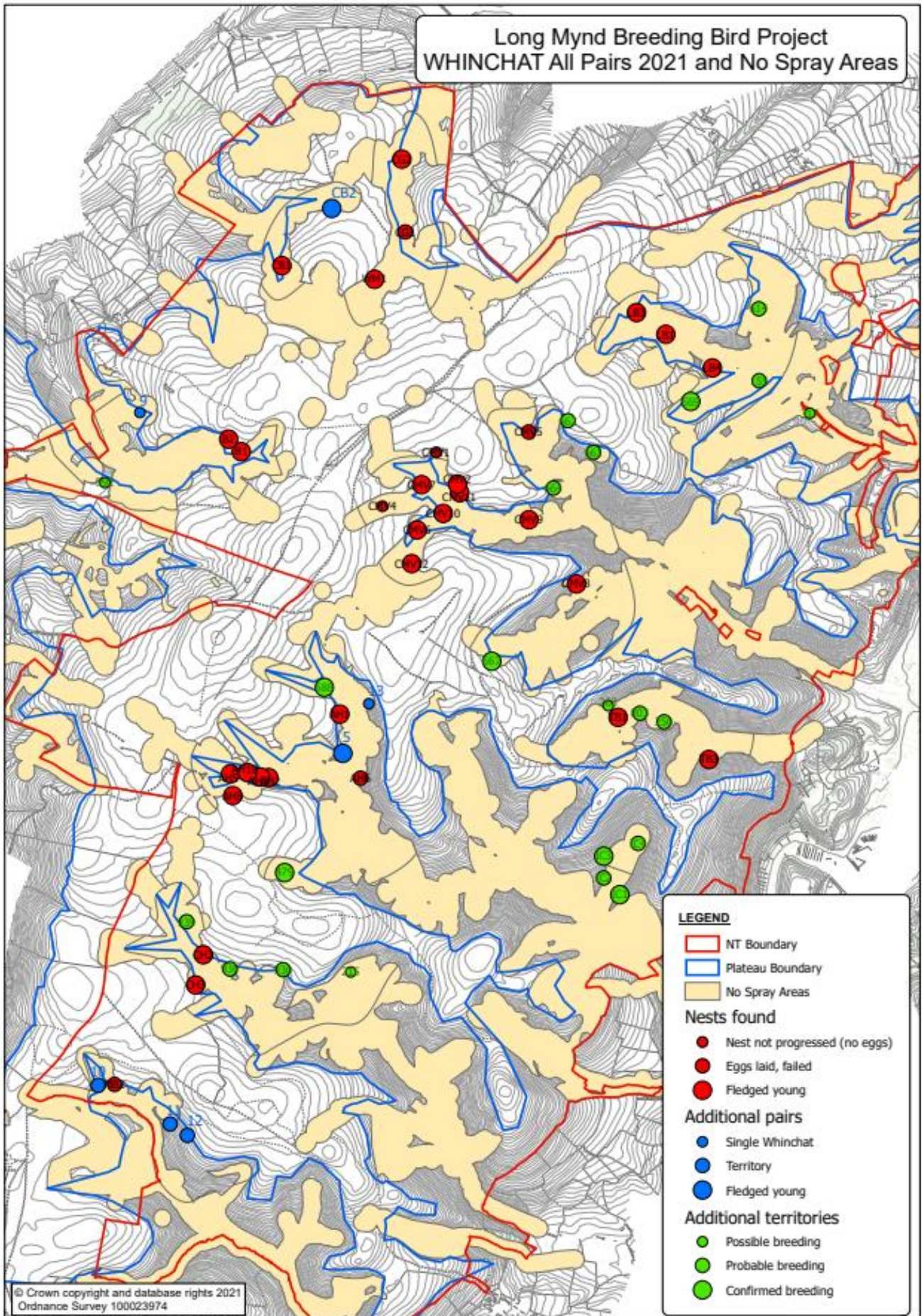


Map 7. "Whinchat Occupation areas" 2021 on the 2017 Habitats Map

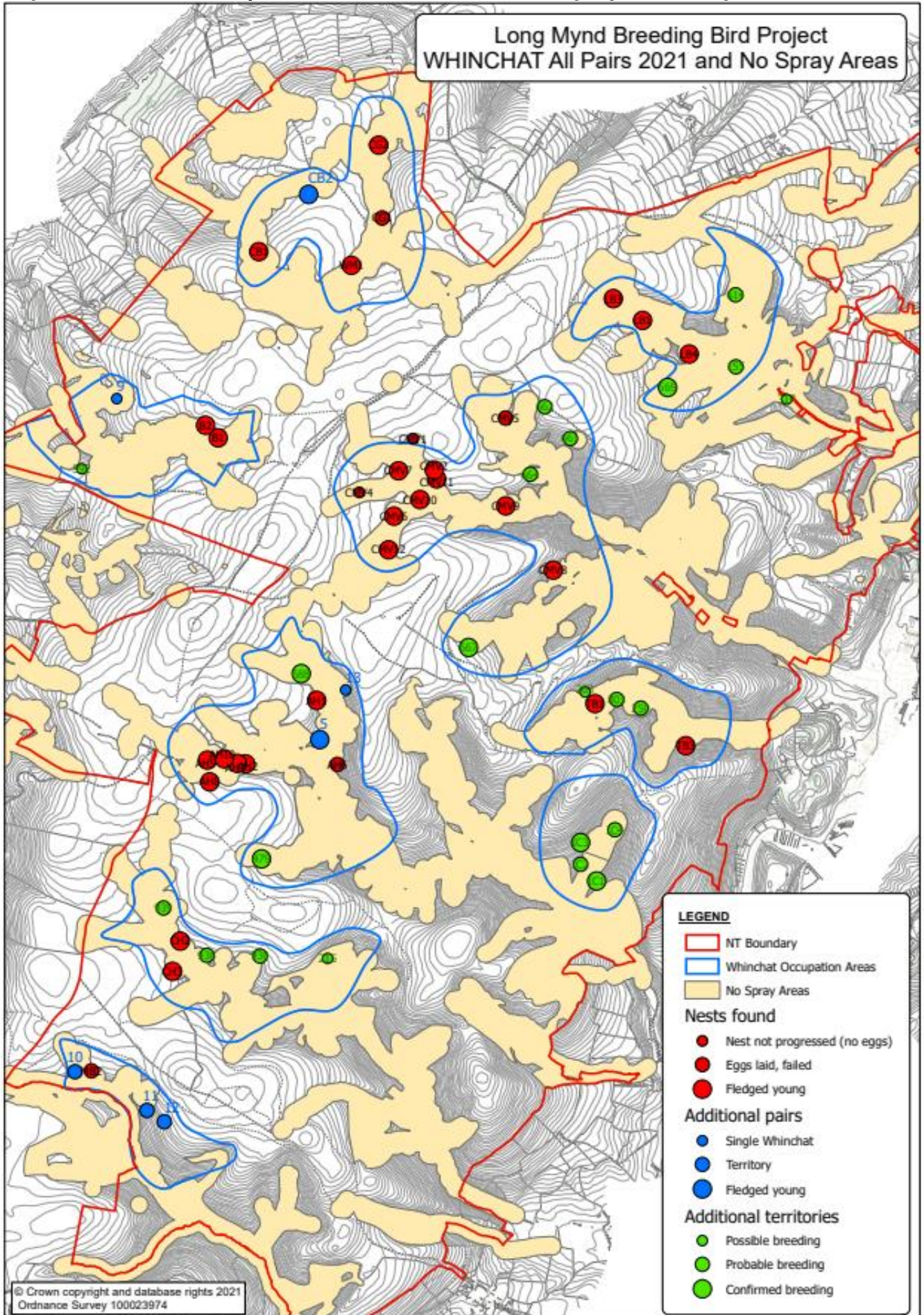


Map 8. All pairs 2021 on the No-spray areas map, with the plateau boundary

There is an exclusion zone for bracken spraying, all land less than 50m from a watercourse, which is the background to this map.

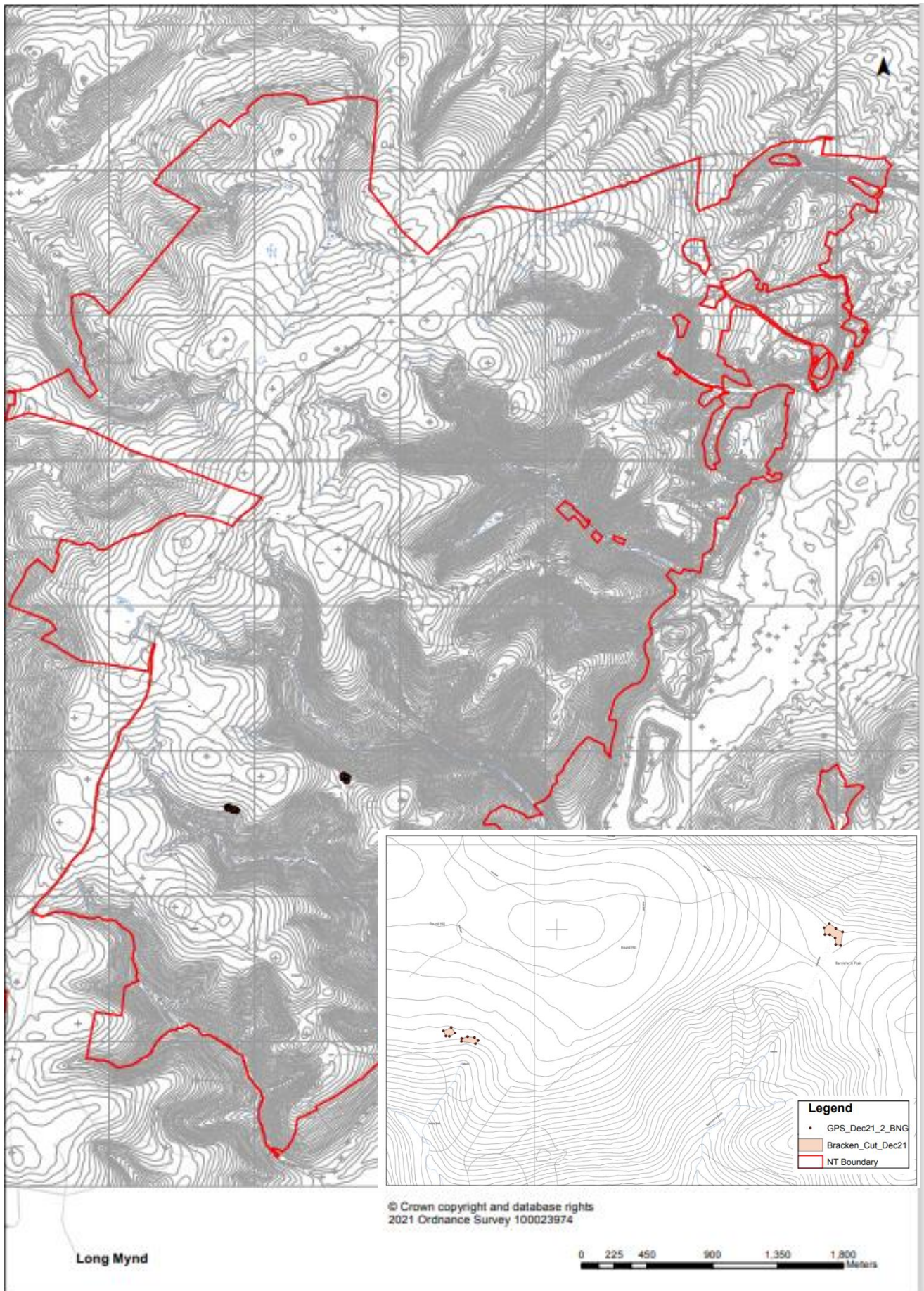


Map 9. "Whinchat Occupation areas" 2021 on the No-spray areas map





Map 10. Bracken Management map 2021

Three trial plots, one in the upper slopes of Ashes Hollow below Barrister's Plain, and two in Callow Hollow below Round Hill



**Appendix 1. Project Proposal 2019
, the basis of the OCC Delivery Plan**

**Our Common Cause: Our Upland Commons
Detailed Project Plans – development template**

<p>Title and Project Code</p>	<p>Improving Public Benefits: Flagship habitats and species Whinchat Conservation Project on the Long Mynd</p>
<p>Summary</p> 	<p>The Whinchat Project aims to discover the reasons for the population decline and develop ways of reversing it.</p> <ol style="list-style-type: none"> i. Current breeding success will be assessed, over the whole site, and in relation to the different bracken and other habitats. ii. A comparison will be made of the relative proportions of the population in each habitat in 1994-98, 2006-09 and 2017 onwards, to assess whether declines are more marked in some habitats than others (in particular, bracken with bracken litter understorey), and whether bracken control and / or changes in sheep densities has had any noticeable effect. iii. Other habitat variables will be recorded at nest sites iv. In the light of the analysis of the results, bracken management trials will be undertaken and assessed in the second and third years of the project.
<p>Project Description</p> 	<p>Why is the project needed? Nationally, the Whinchat population has declined by 53% in the UK, and 44% in England, in only 21 years between 1995 and 2016. It is now localised in England, occurring in northern uplands, but only in pockets in the south, such as Salisbury Plain and the south-west (Devon) (BBS Report 2017). It was moved from the <i>Amber List of Birds of Conservation Concern</i> to the <i>Red List</i> in 2015 because of this severe decline in the breeding population.</p> <p>In Shropshire, the 1985-90 Breeding Bird Atlas showed them widespread in the uplands (Clun Forest, Stretton Hills, Clee Hills, Stapeley Hill and the whole Stiperstones ridge, as well as Long Mynd), but the population has declined from an estimated 300 pairs in 1998 to 75 in 2013, a reduction of 75%. Whinchats are now restricted to the Long Mynd, apart from 1 - 2 pairs on the Stiperstones.</p> <p>The Long Mynd Breeding Bird Project estimated the population at 110-130 breeding pairs in 1996-1998, but only around 60 pairs in 2006-09, a decline of around 50% in only 10 years.</p> <p>The project will build on the results of the Long Mynd Breeding Bird Survey, which aims to update the 1994-98 and 2006-09 surveys, using a team of volunteers. This survey aims to estimate the population of around 20 species, those where the Long Mynd holds a significant proportion of the County population (including Whinchat), using the Territory Mapping Method. It does not attempt to locate nests or assess productivity. It started in 2017, and observations of Whinchats by the surveyors, particularly early in the season, will help the project locate territories (and hence nests).</p>

Reversing the decline of Whinchat is an important conservation priority for the Long Mynd, and its owner the National Trust. Achieving the aims requires a long-term study and action plan.

Funding has been secured from the Shropshire Hills AONB Conservation Fund, and the Development Phase of the *Our Common Cause: Our Upland Commons* project, for a pilot project to test and evaluate proposals for a Whinchat conservation project on the Long Mynd in 2019. This funding is gratefully acknowledged. National Trust has also contributed to the costs.

Based on the results, this application is for a three-year project to be included in the Delivery Phase of the project 2020-23.

Whinchats breed on several of the Commons in other parts of the country involved in *Our Common Cause*, and the spread of bracken is an issue on several of them too. Nationally, a third of the land owned by the National Trust is upland Common, so insights into effective Whinchat conservation and bracken management may inform land management decisions on many NT properties, as well as the other Commons involved in *Our Common Cause* and other Commons across the country.

The Project therefore aims to discover the reasons for the decline and develop ways of reversing it.

Based on an early analysis of these issues and the habitat monitoring forms at the end of the pilot project, and results of research elsewhere, a more detailed set of questions and hypotheses about the drivers of decline will be agreed with project partners and tested in the later years. This may require modifications to the nest monitoring form, to ensure the appropriate detail is recorded for vegetation structure, soil moisture, tree density, distance to watercourse and altitude. Appropriate Habitat management trials will be carried out and monitored.

Project methods

1. Pinpoint the location of breeding territories, during the early visits of the volunteers carrying out the Breeding Bird Survey
2. Find as many nests as possible, early in the breeding cycle, and monitor the outcomes, using trail cameras, which hopefully will record any predation event, and, as a back-up, place thermacrons in the nests (which record temperature, giving a time of day/night of any nest failure, and hence an indication of likely predator). A professional ecologist will carry out this work.
3. Catch and colour-ring as many adults as possible, initially when males establish territories and attract mates early in the season (which will help ensure that all nests have been found), and then, later in the season, when adults are feeding young in the nest, catch any remaining unringed adults, then ring all chicks in the nest. The colour-ring combination on each bird will be unique, which ensures that each individual can be identified in the field. The proportion returning each following year gives an indication of longevity, and mortality rates between the

	<p>end of the breeding season and the start of the next one (i.e. it assesses the combined effect on adults and juveniles of mortality on the Long Mynd before migration, on the outward autumn and return spring migration journeys, and on the wintering grounds in Africa, which indicates whether population decline is driven by poor breeding success (factors on the Long Mynd) or other factors. A BTO-qualified bird ringer needs to undertake this part of the project.</p> <ol style="list-style-type: none"> 4. Complete a detailed nest monitoring form for each nest found, to assess the vegetation/habitat in each Whinchat territory, and 5. Compare the distribution in relation to the 16 categories on the habitat (vegetation) map with those found in 1994-98 (Appendix 1) and 2006-09 (<i>in prep.</i>), by overlaying the Whinchat distribution map on the Vegetation map within the National Trust's GIS system. 6. Subjective assessments of features that nest sites have in common will be made by the nest finder, ringer and project co-ordinator, and based on this a further visit will be made to as many sites as possible for habitat recording and assessment by Andy Perry (National Trust ecologist) at end of season and before bracken gets too high 7. Depending on the results of 4-6 above, undertake management works during each following winter to seek to improve a sample of territories, and monitor whether the works are beneficial. Interventions to be trialled include management of grazing pressure, and cutting bracken, particularly the removal of bracken litter understory.
<p>Beneficiaries and Communication</p>	<ul style="list-style-type: none"> • Whinchat – A nationally important species, distinctive to upland commons. It was moved from the <i>Amber List of Birds of Conservation Concern</i> to the <i>Red List</i> in 2015 because of this severe decline in the breeding population. • Commoners/landowners • Conservation partners • Local people • Visitors
<p>Project Buy-in</p>	<p>Who has been involved in developing the project or been consulted about it?</p> <p>Leo Smith (SOS & project lead), volunteers, landowners, commoners and active graziers, Dave Cragg (NE Lead Adviser for Long Mynd, Stiperstones, Clee Liberty, and Upper Onny Catchment), NT, RSPB, BTO, local Community Wildlife Groups.</p>
<p>Project Lead</p>	<p>Project Personnel</p> <ol style="list-style-type: none"> i. Project co-ordination (to include effective working arrangements between project personnel, and with the volunteers undertaking the Breeding Bird Survey, together with Annual Reports and monitoring returns to funding bodies) will be undertaken by <i>Leo Smith Ornithological Surveys & Consultancy</i> ii. Nest finding and monitoring productivity will be carried out by Martyn Owen and Richard Moores of Biome Consulting iii. Ringing and colour-ringing will be carried out by BTO licensed ringer Andy Spencer

	<p>iv. Preparation of distribution maps will be undertaken by Debby Santry, NT GIS Data Officer for the Midlands and habitat analysis of the areas around the nest sites will be undertaken by Andrew Perry, NT Ecologist</p> <p>v. Planning and implementing interventions and trials to improve habitat will be co-ordinated and overseen by Peter Carty, NT South Shropshire Countryside Parkland and Gardens manager</p>
Who else will support delivery? Partners/Contractors etc	<p>Volunteers, contractors, landowners, commoners and active graziers, Dave Cragg (NE Lead Adviser for Long Mynd, Stiperstones Clee Liberty, and Upper Onny Catchment). We will cooperate closely with RSPB Conservation Science to ensure that the lessons of their three-year research study, including any proposal for further research, are incorporated.</p>
Project Development	<p>A pilot project was undertaken in 2019, with funding from OCC Shropshire Hills Development Fund (£500), National Trust (£2,000) and Shropshire Hills AONB Conservation Fund (£2,500). This found that</p> <ul style="list-style-type: none"> • Nests were very difficult to find once the female started incubating the eggs, so the nest finding needs to start about 15 May while nests are still being completed, and be concentrated in the following two-week period. • A few extra days work by the Contractor are needed to have a good chance of reaching the target of finding about 30 nests (75% of the total) • VAT needs to be claimed from the project by the Contractor. • The timing of visits by the ringer, and the number, needs to be revised. • Some of the necessary equipment was bought for the pilot project, so costs for that, and training, can be reduced or removed • Location of Whinchats by volunteers working on the Long Mynd Breeding Bird Project (LMBBP) was extremely helpful for both the nest finder and ringer (this project is included in the “Wheatear and Upland Bird Monitoring” OCC project proposal). <p>NB The pilot project has not yet been completed, but the results and conclusions will be available before detailed planning for the 2020 project work is undertaken. No further consents and project approvals are needed</p>
Activities & Timetable	<ol style="list-style-type: none"> 1. Visits to Whinchat habitat by volunteers on the LMBBP to locate Whinchat territories: Early May 2. LMBBP data collated and passed to Biome: 14 May, and map produced as soon as possible thereafter (Co-ordinator, volunteers and NT GIS officer) 3. Visits to territories to find nests, install monitoring equipment (cameras and thermacrons) and record habitat at and around each nest, by Biome Consulting: 15-27 May (subject to assessing that the breeding timetable each year is not affected by unusual weather conditions). 4. Second round of visits to Whinchat territories by volunteers on the LMBBP to locate Whinchat nest sites (places where adults are carrying food back to a nest, for chicks) not found by Biome

5. Visits by ringer to ring chicks in nests found by Biome, and attempt to find more in territories located by LMBBP volunteers.
 6. Visits to nests found during the fieldwork, by Andy Perry (NT Ecologist), to record and assess habitat at and near the nest site (July-August)
 7. Assessment of results, and consideration of options for habitat management works: NT and Project Co-ordinator, each autumn
 8. Implementation of habitat management works, as appropriate October-March
- Detailed proposals and specifications: what needs to happen when; start and finish dates; principal milestones.

Budget

Expenditure Summary

Assumptions: total population about 40 pairs of Whinchat

- i. in the pilot project (2019), aim to find 18 nests found (12 days nest-finding work), just under half the population
- ii. in the full project (annually, 2020 -23) aim to find 30 nests found (22 days work + 1 day retrieving the nest monitoring equipment) (including record keeping and data analysis, etc.).
- iii. In all years, a trail camera and thermacron to monitor each nest, travel mileage and overnights at Bridges YHA for ringer, cost of rings and colour-rings for up to 60 adults and 120 nestlings (allowing for some failure of found nests)
- iv. Set-up costs (mainly in year one only): training, and purchase of thermacrons for monitoring nests, and mist nets and spring traps for catching adults.

Item	Pilot Project Approved budget 2019 £	Proposed Budget Per year 2020-23 £
Nest finder (including VAT)	2,400.00	5,520
Trail cameras (rent 30 @ £40)	720.00	1,200.00
Thermacrons (18 @ £25 in 2019, 5 in 2020)	450.00	125.00
Ringer's expenses	600.00	935.00
Ringer's equipment	230.00	220.00
Training	200.00	
Co-ordination	400.00	1,000.00
Total	5,000.00	9,000.00

Trail cameras to monitor nests will be supplied by the nest finder, Biome Consulting. The project will pay a rent of £40 each, to include batteries and SD cards.

NT has agreed to contribute £2,000 per year cash, in addition to 5 days of in-kind staff time, to the OCC bird projects. As the spend

	<p>on this Whinchat project is higher than on Wheatear, this cash has been set against this Whinchat project.</p> <p>Volunteer time for the Long Mynd Bird Survey is all shown in the Wheatear project, but it is essential for this Whinchat project as well.</p> <p>NB If it is helpful to OCC, the NT cash contribution, and / or the value of volunteer effort finding Whinchats and Wheatears for LMBBP, can be apportioned across the two projects</p> <p>NB. Evaluation of the Pilot project is not yet complete, and it may be necessary to fine tune the costs.</p> <p>Total cost of project (cash) per year 2020-23 = £9,000, to be funded £7k by OCC grant, and £2k by National Trust.</p> <p><u>Contribution in kind by NT for Andy Perry’s work, based on Pilot project = 75 hours @ £21 = £1,575 per year.</u> This time is likely to increase once habitat management work starts, and there will be contributions from Pete Carty and other NT staff. This cannot be estimated at present, but will be monitored and reported.</p>											
<p>Outputs</p>	<p><u>All years</u></p> <ol style="list-style-type: none"> 1. Whinchat nests found 2. Nest site habitat recording forms completed 3. Productivity of nests (i.e., % of successful nests, causes of failure, number of chicks fledged) 4. Whinchats colour-ringed <p><u>Second and third years</u></p> <ol style="list-style-type: none"> 1. Area of habitat managed 2. Number of colour-ringed birds returning after wintering in Africa <p><u>Third Year</u></p> <ol style="list-style-type: none"> 1. Guidance note on managing bracken for Whinchats and sheep graziers, applicable to other commons participating in OCC, other commons generally, and upland properties owned and / or managed by the National Trust 											
<p>Output Indicators & Targets</p>	<p>Although it is hoped to find 30 nests each year, and ring the chicks in them, no outputs can be guaranteed, because factors beyond our control may influence this (up or down). For example, the population fluctuates each year, and may return early or late from Africa, while bad weather may limit the fieldwork effort at key times, and increase nest failure rates (as it did in 2019). No output target can be set for Area of habitat managed, as that depends on the findings of the research</p>											
<p>Outcomes</p>	<p>What outcomes will this project lead to, either on its own or in combination with other projects? See “Outputs Third year” above</p> <table border="1" data-bbox="622 1814 1420 2060"> <tr> <td rowspan="5" style="text-align: center;">Outcomes for Heritage</td> <td style="text-align: center;">Better managed</td> <td style="text-align: center;">x</td> </tr> <tr> <td style="text-align: center;">In better condition</td> <td style="text-align: center;">x</td> </tr> <tr> <td style="text-align: center;">Better interpreted and explained</td> <td style="text-align: center;">x</td> </tr> <tr> <td style="text-align: center;">Identified/recorded</td> <td style="text-align: center;">x</td> </tr> <tr> <td style="text-align: center;">Developed skills</td> <td style="text-align: center;">x</td> </tr> </table>	Outcomes for Heritage	Better managed	x	In better condition	x	Better interpreted and explained	x	Identified/recorded	x	Developed skills	x
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	Developed skills	x										

	<table border="1"> <tr> <td data-bbox="598 91 927 304" rowspan="3">Outcomes for People</td> <td data-bbox="927 91 1335 129">Learnt about heritage</td> <td data-bbox="1335 91 1401 129"></td> </tr> <tr> <td data-bbox="927 129 1335 199">Changed their attitudes/behaviour</td> <td data-bbox="1335 129 1401 199">x</td> </tr> <tr> <td data-bbox="927 199 1335 268">Had an enjoyable experience</td> <td data-bbox="1335 199 1401 268">x</td> </tr> <tr> <td data-bbox="927 268 1335 304">Volunteered time</td> <td data-bbox="1335 268 1401 304">x</td> <td data-bbox="1401 268 1477 304"></td> </tr> <tr> <td data-bbox="598 304 927 725" rowspan="5">Outcomes for communities</td> <td data-bbox="927 304 1335 374">Negative environmental impacts will be reduced</td> <td data-bbox="1335 304 1401 374">x</td> </tr> <tr> <td data-bbox="927 374 1335 479">More people/wider range of people will have engaged</td> <td data-bbox="1335 374 1401 479">x</td> </tr> <tr> <td data-bbox="927 479 1335 584">Your local area will be a better place to live, work or visit</td> <td data-bbox="1335 479 1401 584">x</td> </tr> <tr> <td data-bbox="927 584 1335 654">Your local economy will be boosted</td> <td data-bbox="1335 584 1401 654"></td> </tr> <tr> <td data-bbox="927 654 1335 725">Your organisation will be more resilient</td> <td data-bbox="1335 654 1401 725"></td> </tr> </table>	Outcomes for People	Learnt about heritage		Changed their attitudes/behaviour	x	Had an enjoyable experience	x	Volunteered time	x		Outcomes for communities	Negative environmental impacts will be reduced	x	More people/wider range of people will have engaged	x	Your local area will be a better place to live, work or visit	x	Your local economy will be boosted		Your organisation will be more resilient		
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	Your organisation will be more resilient																						
Evidence	<p>An Annual Project Report will be produced by the Co-ordinator, listing results, outputs, with an assessment and recommendations for habitat management to be discuss with NT and commoners. Recommendations may also identify proposed changes to the project, for discussion with the OCC management team.</p>																						
Wider Context	<p>Links with other Whinchat Projects</p> <p>Initially, the colour-ringing will be carried out under the auspices of a long-term project conducted at RSPB Geltsdale (North-east Cumbria) since 2011 by Stephen Westerberg, who will advise the Long Mynd project, and determine the colour-ring combinations that can be used here. The local ringer will use his own BTO rings. BTO have agreed to this arrangement.</p> <p>Jenni Border (nee Taylor), who now works for BTO, will advise on methods and results found on Salisbury Plain, to ensure that this project learns from, and complements, existing knowledge.</p> <p>The National Trust and RSPB jointly manage the Eastern Moors, in the Peak District, and the Whinchat population has more than doubled, from 25 pairs in 2010 to 60 pairs in 2015. This is in stark contrast to trends on Long Mynd. The project will work with the Eastern Moors Partnership to establish the reasons for the trend there (in particular, if habitat changes have occurred, is their nature and impact understood?), and whether the increase been maintained.</p> <p>RSPB has been undertaking research since 2016, investigating the causes of Whinchat declines across the UK. The aim is to look at the habitats that breeding birds are associated with and identify whether habitat change is driving declines. This project will hopefully run over several years, and in 2017 it undertook a habitat comparison in areas with increasing, stable and declining trends, assessed from national BBS results. This continued in 2018, undertaking a detailed analysis of BBS 200m transects. The results will be written up this autumn. Discussions will take place with Andrew Stanbury (RSPB Conservation Science, overseeing the RSPB research), to agree the issues and hypotheses that we are trying to test through the project.</p>																						

	<p>Surveying for Whinchat will also take place on the other two Commons in Shropshire in the <i>Our Common Cause</i> project, Stiperstones and Clee Liberty. The former is already included in bird survey work undertaken by NNR staff, and the latter is covered by the Abdon Community Wildlife Group bird survey. Commons that are part of the <i>Our Common Cause</i> project in other parts of England can be encouraged to undertake complementary conservation projects – all three have Whinchat populations, although the decline there may already be too severe for an intensive conservation project like this one to be viable.</p> <p>Plans are underway to establish a national Whinchat Study Group, which will include all the above-mentioned initiatives, and share knowledge gained. There is already an International Whinchat Working Group which has produced three WhinCHAT digital magazines, available on https://braunkehlchen.jimdo.com/ Leo Smith contributed an article on the changing status of Whinchat in Shropshire, and on the Long Mynd.</p>
<p>Legacy & Maintenance of Benefits</p>	<p>Beyond the end of HLF funding period:</p> <ul style="list-style-type: none"> • See “Outputs Year 3” above • Ongoing management works will be required to secure ongoing benefits, and this is the responsibility of the National Trust, the owners of the Long Mynd. This proposal is made on behalf of NT, with a substantial contribution from them, in cash and in kind (staff time) so they can identify precisely what it is necessary for them to do.
<p>Risks & Mitigation</p>	<p>The project risk register should identify factors that might prevent this project from meeting its targets. A perceptive and robust risk analysis is indicative of a sound approach to project management. The risk table should describe the nature of the risk, its severity, likelihood it will happen and the measures being taken / to be taken to address these.</p> <p>A pilot project has been carried out, and this project proposal has been revised as a result.</p> <p>Otherwise, risks are restricted to bad weather, and health of project personnel and their immediate relatives!!!!</p>

Appendix 2. The Location and Outcome of every nest

All found nests (40)			with eggs of each		Nest Outcome	No. of chicks ringed
Nest Reference	O.S. Grid Reference		Nest Reference	Map Dot size		
	Easting	Northing				
AH1	42207	94013	AH1	3	Fledged (not ringed)	
AH10	41693	93688	AH10	3	Ringed & Fledged	4
AH2	41812	93660	AH2	3	Ringed & Fledged	5
AH3	41612	93560			Failed: eggs abandoned, moved to AH8 (fledged)	
AH5	41599	93681		3	Failed: eggs abandoned, moved to AH9 (fledged)	
AH6	42322	93657	AH6	2	Failed: eggs predated, no relay found	
AH7	41766	93663	AH7	3	Failed after ringing	6
AH8	41612	93560	AH8	3	Fledged (not ringed) (second nest)	
AH9	41645	93684	AH9		Ringed & Fledged (second nest)	4
B1	41659	95472	B1	3	Ringed & Fledged	6
B2	41589	95542	B2	3	Ringed & Fledged	5
CB1	41885	96507	CB1	3	Ringed & Fledged	6
CG1	42571	96694	CG1	2	Failed: eggs predated - first clutch of CG3	
CG2	42552	97099	CG2	3	Ringed & Fledged	6
CG3	42617	96639			Failed: eggs predated - second clutch of CG1	
CH1	41381	92618			Failed: before eggs - moved to CH2 (failed again)	
CH2	41448	92675	CH2	3	Failed after ringing (second nest)	6
CH3	41405	92507	CH3	3	Ringed & Fledged	5
CMV1	42743	95468	CMV1	1	Failed: before eggs: female believed predated	
CMV10	42782	95129	CMV10	3	Ringed & Fledged	5
CMV11	42874	95244	CMV11	3	Ringed & Fledged	6
CMV12	42607	94850	CMV12	3	Ringed & Fledged	6
CMV2	42861	95293	CMV2	3	Ringed & Fledged	6
CMV3	42609	95233			Failed: before eggs - moved to CMV7 (fledged)	
CMV4	42444	95169	CMV4	1	Failed: before eggs, no relay found	
CMV5	43257	95582	CMV5	2	Failed: eggs abandoned, no relay found	
CMV6	42637	95037	CMV6	3	Ringed & Fledged	5
CMV7	42662	95289	CMV7	3	Ringed & Fledged (second nest)	5
CMV8	43523	94737	CMV8	3	Ringed & Fledged	6
CMV9	43259	95094	CMV9	3	Ringed & Fledged	6
LB1	44020	96125	LB1	3	Ringed & Fledged	6
LB2	44149	95976			Failed: before eggs - moved to LB4 (fledged)	
LB3	43857	96246	LB3	3	Ringed & Fledged	5
LB4	44279	95938	LB4	3	Ringed & Fledged (second nest)	6
MB1	40964	91945			Failed: before eggs - moved to MB2 (failed again)	
MB2	40954	91954	MB2	2	Failed: eggs abandoned, no relay found	
TB1	43755	93995		3	Failed: eggs trampled - moved to TB2 (fledged)	
TB2	43737	93965	TB2		Ringed & Fledged	5
TB3	44260	93761	TB3	3	Ringed & Fledged	4
WM1	42400	96431	WM1	3	Fledged (not ringed)	

Appendix 3. Ringing and Colour-ringing Results

126 pullus and 5 adult males ringed at 23 nests

KEY:

4M = ADULT, AGE NOT KNOWN

1P = PULLUS (Chick)

Colour-rings

Ref.	Colour
B	Blue
C	Carmine
G	Green
L	Lime
N	Niger (black)
O	Orange
P	Pale blue
R	Red
S	Silver
U	Umber (brown)
V	Violet
W	White
Y	Yellow

Date	BTO Ring number	Left leg		Right leg		Age of chicks (days old)	Brood	Age	Nest site reference	Time
		Above	Below	Above	Below					
8/6/21	AJR0169	N	B	P	BTO			4M	CMV8 New Pool Hollow	10:50
8/6/21	AJR0170	N	C	P	BTO	7 dyo + 1 egg	6/6	1P	CMV8 New Pool Hollow	11:00
8/6/21	AJR0171	N	G	P	BTO	7 dyo + 1 egg	6/6	1P	CMV8 New Pool Hollow	11:00
8/6/21	AJR0172	N	N	P	BTO	7 dyo + 1 egg	6/6	1P	CMV8 New Pool Hollow	11:00
8/6/21	AJR0173	N	O	P	BTO	7 dyo + 1 egg	6/6	1P	CMV8 New Pool Hollow	11:00
8/6/21	AJR0174	N	R	P	BTO	7 dyo + 1 egg	6/6	1P	CMV8 New Pool Hollow	11:00
8/6/21	AJR0175	N	V	P	BTO	7 dyo + 1 egg	6/6	1P	CMV8 New Pool Hollow	11:00
14/6/21	AJR0485	R	C	P	BTO	8 dyo + 1 egg	5/5	1P	AH2 Ashes Hollow	08:30
14/6/21	AJR0486	R	G	P	BTO	8 dyo + 1 egg	5/5	1P	AH2 Ashes Hollow	08:30
14/6/21	AJR0487	R	N	P	BTO	8 dyo + 1 egg	5/5	1P	AH2 Ashes Hollow	08:30
14/6/21	AJR0488	R	O	P	BTO	8 dyo + 1 egg	5/5	1P	AH2 Ashes Hollow	08:30
14/6/21	AJR0489	R	R	P	BTO	8 dyo + 1 egg	5/5	1P	AH2 Ashes Hollow	08:30
14/6/21	AJR0490	V	B	P	BTO			4M	AH2 Ashes Hollow	09:00
14/6/21	AJR0478	O	C	P	BTO	7 dyo	6/6	1P	AH7 Ashes Hollow	07:30
14/6/21	AJR0479	O	G	P	BTO	7 dyo	6/6	1P	AH7 Ashes Hollow	07:30
14/6/21	AJR0480	O	O	P	BTO	7 dyo	6/6	1P	AH7 Ashes Hollow	07:30
14/6/21	AJR0481	O	R	P	BTO	7 dyo	6/6	1P	AH7 Ashes Hollow	07:30
14/6/21	AJR0483	O	V	P	BTO	7 dyo	6/6	1P	AH7 Ashes Hollow	07:30
14/6/21	AJR0484	O	W	P	BTO	7 dyo	6/6	1P	AH7 Ashes Hollow	07:30
14/6/21	AJR0497	W	C	P	BTO	8 dyo	6/6	1P	B1 Bilbatch	14:20
14/6/21	AJR0498	W	G	P	BTO	8 dyo	6/6	1P	B1 Bilbatch	14:20
14/6/21	AJR0499	W	N	P	BTO	8 dyo	6/6	1P	B1 Bilbatch	14:20
14/6/21	AJR0500	W	O	P	BTO	8 dyo	6/6	1P	B1 Bilbatch	14:20
14/6/21	AJR0501	W	R	P	BTO	8 dyo	6/6	1P	B1 Bilbatch	14:20
14/6/21	AJR0502	W	W	P	BTO	8 dyo	6/6	1P	B1 Bilbatch	14:20
14/6/21	AJR0503	P	G	P	BTO	8 dyo + 1 egg	5/5	1P	B2 Bilbatch	15:30
14/6/21	AJR0504	P	O	P	BTO	8 dyo + 1 egg	5/5	1P	B2 Bilbatch	15:30
14/6/21	AJR0505	P	S	P	BTO	8 dyo + 1 egg	5/5	1P	B2 Bilbatch	15:30
14/6/21	AJR0506	P	W	P	BTO	8 dyo + 1 egg	5/5	1P	B2 Bilbatch	15:30
14/6/21	AJR0507	P	Y	P	BTO	8 dyo + 1 egg	5/5	1P	B2 Bilbatch	15:30
14/6/21	AJR0491	V	C	P	BTO	8 dyo	6/6	1P	CH2 Callow Hollow	11:00
14/6/21	AJR0492	V	G	P	BTO	8 dyo	6/6	1P	CH2 Callow Hollow	11:00
14/6/21	AJR0493	V	N	P	BTO	8 dyo	6/6	1P	CH2 Callow Hollow	11:00
14/6/21	AJR0494	V	O	P	BTO	8 dyo	6/6	1P	CH2 Callow Hollow	11:00
14/6/21	AJR0495	V	R	P	BTO	8 dyo	6/6	1P	CH2 Callow Hollow	11:00
14/6/21	AJR0496	V	Y	P	BTO	8 dyo	6/6	1P	CH2 Callow Hollow	11:00
15/6/21	AJR0552	N	C	U	BTO	9 dyo	6/6	1P	LB1 Long Batch	18:00
15/6/21	AJR0553	N	G	U	BTO	9 dyo	6/6	1P	LB1 Long Batch	18:00
15/6/21	AJR0554	N	N	U	BTO	9 dyo	6/6	1P	LB1 Long Batch	18:00
15/6/21	AJR0555	N	O	U	BTO	9 dyo	6/6	1P	LB1 Long Batch	18:00
15/6/21	AJR0556	N	R	U	BTO	9 dyo	6/6	1P	LB1 Long Batch	18:00
15/6/21	AJR0557	N	W	U	BTO	9 dyo	6/6	1P	LB1 Long Batch	18:00
15/6/21	AJR0520	C	C	U	BTO	5 dyo	6/6	1P	CMV11	09:10
15/6/21	AJR0521	C	G	U	BTO	5 dyo	6/6	1P	CMV11	09:10
15/6/21	AJR0522	C	N	U	BTO	5 dyo	6/6	1P	CMV11	09:10
15/6/21	AJR0523	C	O	U	BTO	5 dyo	6/6	1P	CMV11	09:10
15/6/21	AJR0524	C	R	U	BTO	5 dyo	6/6	1P	CMV11	09:10
15/6/21	AJR0525	C	W	U	BTO	5 dyo	6/6	1P	CMV11	09:10
15/6/21	AJR0514	B	G	U	BTO	7 dyo	6/6	1P	CMV2	08:40
15/6/21	AJR0515	B	N	U	BTO	7 dyo	6/6	1P	CMV2	08:40
15/6/21	AJR0516	B	O	U	BTO	7 dyo	6/6	1P	CMV2	08:40
15/6/21	AJR0517	B	R	U	BTO	7 dyo	6/6	1P	CMV2	08:40
15/6/21	AJR0518	B	W	U	BTO	7 dyo	6/6	1P	CMV2	08:40
15/6/21	AJR0519	B	Y	U	BTO	7 dyo	6/6	1P	CMV2	08:40

Appendix 3 (continued)

Date	BTO Ring number	Left leg		Right leg		Age of chicks (days old)	Brood	Age	Nest site reference	Time
		Above	Below	Above	Below					
15/6/21	AJR0532	O	C	U	BTO	8 dyo + 1egg	6/6	1P	CMV6	11:00
15/6/21	AJR0533	O	G	U	BTO	8 dyo + 1egg	6/6	1P	CMV6	11:00
15/6/21	AJR0534	O	N	U	BTO	8 dyo + 1egg	6/6	1P	CMV6	11:00
15/6/21	AJR0535	O	O	U	BTO	8 dyo + 1egg	6/6	1P	CMV6	11:00
15/6/21	AJR0536	O	R	U	BTO	8 dyo + 1egg	6/6	1P	CMV6	11:00
15/6/21	AJR0537	O	W	U	BTO	8 dyo + 1egg	6/6	1P	CMV6	11:00
15/6/21	AJR0508	Y	C	P	BTO	7 dyo	5/5	1P	CMV7	07:30
15/6/21	AJR0509	Y	G	P	BTO	7 dyo	5/5	1P	CMV7	07:30
15/6/21	AJR0510	Y	N	P	BTO	7 dyo	5/5	1P	CMV7	07:30
15/6/21	AJR0511	Y	O	P	BTO	7 dyo	5/5	1P	CMV7	07:30
15/6/21	AJR0512	Y	R	P	BTO	7 dyo	5/5	1P	CMV7	07:30
15/6/21	AJR0513	Y	B	P	BTO			4M	CMV7	07:40
15/6/21	AJR0526	G	Y	U	BTO	7 dyo	6/6	1P	CMV9	10:10
15/6/21	AJR0527	G	C	U	BTO	7 dyo	6/6	1P	CMV9	10:10
15/6/21	AJR0528	G	G	U	BTO	7 dyo	6/6	1P	CMV9	10:10
15/6/21	AJR0529	G	N	U	BTO	7 dyo	6/6	1P	CMV9	10:10
15/6/21	AJR0530	G	O	U	BTO	7 dyo	6/6	1P	CMV9	10:10
15/6/21	AJR0531	G	R	U	BTO	7 dyo	6/6	1P	CMV9	10:10
15/6/21	AJR0547	Y	C	U	BTO	8 dyo + 1egg	5/5	1P	LB3 Long Batch	17:30
15/6/21	AJR0548	Y	G	U	BTO	8 dyo + 1egg	5/5	1P	LB3 Long Batch	17:30
15/6/21	AJR0549	Y	N	U	BTO	8 dyo + 1egg	5/5	1P	LB3 Long Batch	17:30
15/6/21	AJR0550	Y	O	U	BTO	8 dyo + 1egg	5/5	1P	LB3 Long Batch	17:30
15/6/21	AJR0551	Y	R	U	BTO	8 dyo + 1egg	5/5	1P	LB3 Long Batch	17:30
15/6/21	AJR0558	B	C	L	BTO	8 dyo	6/6	1P	LB4 Long Batch	18:40
15/6/21	AJR0559	B	G	L	BTO	8 dyo	6/6	1P	LB4 Long Batch	18:40
15/6/21	AJR0560	B	L	L	BTO	8 dyo	6/6	1P	LB4 Long Batch	18:40
15/6/21	AJR0561	B	O	L	BTO	8 dyo	6/6	1P	LB4 Long Batch	18:40
15/6/21	AJR0562	B	P	L	BTO	8 dyo	6/6	1P	LB4 Long Batch	18:40
15/6/21	AJR0563	B	R	L	BTO	8 dyo	6/6	1P	LB4 Long Batch	18:40
15/6/21	AJR0538	R	C	U	BTO	8 dyo	5/5	1P	TB2 Townbrook	12:30
15/6/21	AJR0539	R	G	U	BTO	8 dyo	5/5	1P	TB2 Townbrook	12:30
15/6/21	AJR0540	R	N	U	BTO	8 dyo	5/5	1P	TB2 Townbrook	12:30
15/6/21	AJR0541	R	O	U	BTO	8 dyo	5/5	1P	TB2 Townbrook	12:30
15/6/21	AJR0542	R	R	U	BTO	8 dyo	5/5	1P	TB2 Townbrook	12:30
15/6/21	AJR0543	W	C	U	BTO	9 dyo + 2 eggs	4/4	1P	TB3 Townbrook	13:00
15/6/21	AJR0544	W	G	U	BTO	9 dyo + 2 eggs	4/4	1P	TB3 Townbrook	13:00
15/6/21	AJR0545	W	N	U	BTO	9 dyo + 2 eggs	4/4	1P	TB3 Townbrook	13:00
15/6/21	AJR0546	W	O	U	BTO	9 dyo + 2 eggs	4/4	1P	TB3 Townbrook	13:00
16/6/21	AJR0576	N	C	L	BTO	9 dyo	6/6	1P	CB1 Catbatch	13:30
16/6/21	AJR0577	N	L	L	BTO	9 dyo	6/6	1P	CB1 Catbatch	13:30
16/6/21	AJR0578	N	N	L	BTO	9 dyo	6/6	1P	CB1 Catbatch	13:30
16/6/21	AJR0579	N	O	L	BTO	9 dyo	6/6	1P	CB1 Catbatch	13:30
16/6/21	AJR0580	N	P	L	BTO	9 dyo	6/6	1P	CB1 Catbatch	13:30
16/6/21	AJR0581	N	R	L	BTO	9 dyo	6/6	1P	CB1 Catbatch	13:30
16/6/21	AJR0569	S	C	P	BTO	9 dyo	6/6	1P	CG2	11:00
16/6/21	AJR0571	S	L	P	BTO	9 dyo	6/6	1P	CG2	11:00
16/6/21	AJR0572	S	N	P	BTO	9 dyo	6/6	1P	CG2	11:00
16/6/21	AJR0573	S	O	P	BTO	9 dyo	6/6	1P	CG2	11:00
16/6/21	AJR0574	S	P	P	BTO	9 dyo	6/6	1P	CG2	11:00
16/6/21	AJR0575	S	R	P	BTO	9 dyo	6/6	1P	CG2	11:00
16/6/21	AJR0564	U	C	P	BTO	8 dyo	5/5	1P	CH3	09:00
16/6/21	AJR0565	U	G	P	BTO	8 dyo	5/5	1P	CH3	09:00
16/6/21	AJR0566	U	N	P	BTO	8 dyo	5/5	1P	CH3	09:00
16/6/21	AJR0567	U	O	P	BTO	8 dyo	5/5	1P	CH3	09:00
16/6/21	AJR0568	U	P	P	BTO	8 dyo	5/5	1P	CH3	09:00
19/6/21	AJR0582	L	L	P	BTO	8 dyo	6/6	1P	CMV12 LSH	13:40
19/6/21	AJR0583	L	N	P	BTO	8 dyo	6/6	1P	CMV12 LSH	13:40
19/6/21	AJR0584	L	O	P	BTO	8 dyo	6/6	1P	CMV12 LSH	13:40
19/6/21	AJR0585	L	P	P	BTO	8 dyo	6/6	1P	CMV12 LSH	13:40
19/6/21	AJR0586	L	G	P	BTO	8 dyo	6/6	1P	CMV12 LSH	13:40
19/6/21	AJR0587	L	B	P	BTO	7 dyo	6/6	1P	CMV12 LSH	13:40
9/7/21	AJR0588	L	R	U	BTO	9 dyo	5/5	1P	CMV10	07:00
9/7/21	AJR0589	L	S	U	BTO	9 dyo	5/5	1P	CMV10	07:00
9/7/21	AJR0590	L	U	U	BTO	9 dyo	5/5	1P	CMV10	07:00
9/7/21	AJR0591	L	V	U	BTO	9 dyo	5/5	1P	CMV10	07:00
9/7/21	AJR0592	L	W	U	BTO	9 dyo	5/5	1P	CMV10	07:00
16/7/21	AJR0570	O	B	P	BTO			4M	AH9	08:20
16/7/21	AJR0593	U	R	P	BTO	9 dyo	5/5	1P	AH9	09:30
16/7/21	AJR0594	U	U	P	BTO	9 dyo	5/5	1P	AH9	09:30
16/7/21	AJR0595	U	W	P	BTO	9 dyo	5/5	1P	AH9	09:30
16/7/21	AJR0596	U	Y	P	BTO	9 dyo	5/5	1P	AH9	09:30
16/7/21	AJR0597	U	B	P	BTO	9 dyo	5/5	1P	AH9	09:30
23/7/21	AJR0672	N	B	U	BTO			4M	AH10	08:20
23/7/21	AJR0674	L	C	U	BTO	8 dyo + 2 eggs	4/4	1P	AH10	09:20
23/7/21	AJR0675	L	G	U	BTO	8 dyo + 2 eggs	4/4	1P	AH10	09:20
23/7/21	AJR0676	L	L	U	BTO	8 dyo + 2 eggs	4/4	1P	AH10	09:20
23/7/21	AJR0677	L	N	U	BTO	8 dyo + 2 eggs	4/4	1P	AH10	09:20

Appendix 3 (continued): Ringing and Colour-ringing Results 2019

Date	BTO Ring No	Left leg		Right leg		Days old	OS map	Brood no.	Age	Location (Long Mynd)
		above	below	above	below					
16/05/2019	ANF-0557	B	B	P	BTO		SO4566692650	-	4M	Callow Hollow
18/06/2019	APF-6778	B	C	P	BTO		SO4323195144	-	4M	Light Spout Hollow (LSH 1)
18/06/2019	APF-6779	B	G	P	BTO	6	SO4323195144	5/5	1P	Light Spout Hollow (LSH 1)
18/06/2019	APF-6780	B	N	P	BTO	6	SO4323195144	5/5	1P	Light Spout Hollow (LSH 1)
18/06/2019	APF-6781	B	O	P	BTO	6	SO4323195144	5/5	1P	Light Spout Hollow (LSH 1)
18/06/2019	APF-6782	B	R	P	BTO	6	SO4323195144	5/5	1P	Light Spout Hollow (LSH 1)
18/06/2019	APF-6783	B	V	P	BTO	6	SO4323195144	5/5	1P	Light Spout Hollow (LSH 1)
21/06/2019	APF-6784	B	W	P	BTO		SO4122595656	-	4M	Bilbatch
Not used		B	Y	P	BTO					
17/06/2019	APF-6761	C	B	P	BTO		SO4142191707	-	4F	Minton Batch (MH3)
17/06/2019	APF-6762	(no colour-rings applied)				8	SO4142191707	5/5	1P	Minton Batch (MH3)
17/06/2019	APF-6763	(no colour-rings applied)				8	SO4142191707	5/5	1P	Minton Batch (MH3)
17/06/2019	APF-6764	(no colour-rings applied)				8	SO4142191707	5/5	1P	Minton Batch (MH3)
17/06/2019	APF-6765	(no colour-rings applied)				8	SO4142191707	5/5	1P	Minton Batch (MH3)
17/06/2019	APF-6766	(no colour-rings applied)				8	SO4142191707	5/5	1P	Minton Batch (MH3)
17/06/2019	APF-6757	C	C	P	BTO	10	SO4085191972	4/4	1P	Minton Batch (MH1)
17/06/2019	APF-6758	C	G	P	BTO	10	SO4085191972	4/4	1P	Minton Batch (MH1)
17/06/2019	APF-6759	C	N	P	BTO	10	SO4085191972	4/4	1P	Minton Batch (MH1)
17/06/2019	APF-6776	C	O	P	BTO	8	SO4452796325	4/4	1P	Jonathan's Hollow (JH 1)
17/06/2019	APF-6760	C	R	P	BTO	10	SO4085191972	4/4	1P	Minton Batch (MH1)
Not used		C	V	P	BTO					
17/06/2019	APF-6772	C	W	P	BTO	7	SO4277895145	6/6	1P	Light Spout Hollow (LSH3)
17/06/2019	APF-6769	C	Y	P	BTO	7	SO4277895145	6/6	1P	Light Spout Hollow (LSH3)
17/06/2019	APF-6771	G	B	P	BTO	7	SO4277895145	6/6	1P	Light Spout Hollow (LSH3)
17/06/2019	APF-6767	G	C	P	BTO	7	SO4277895145	6/6	1P	Light Spout Hollow (LSH3)
17/06/2019	APF-6768	G	G	P	BTO	7	SO4277895145	6/6	1P	Light Spout Hollow (LSH3)
17/06/2019	APF-6770	G	N	P	BTO	7	SO4277895145	6/6	1P	Light Spout Hollow (LSH3)
17/06/2019	APF-6775	G	O	P	BTO	8	SO4452796325	4/4	1P	Jonathan's Hollow (JH 1)
Not used		G	R	P	BTO					
Not used		G	V	P	BTO					
17/06/2019	APF-6773	G	W	P	BTO	8	SO4452796325	4/4	1P	Jonathan's Hollow (JH 1)
17/06/2019	APF-6774	G	Y	P	BTO	8	SO4452796325	4/4	1P	Jonathan's Hollow (JH 1)

Appendix 4. Form for Recording Habitat at Nest Sites, and adjacent territories

Habitat recording form for Whinchat nest sites

Version 5, May 2019

Date _____ Nest stage (no. of eggs) _____

Grid Reference: (10 figure): _____ Recorder: _____

1. Where is the nest built? in tussock of grass
 in short grass
 in bracken litter
 in heather
 other (specify): _____

height (cm):

Please record approximate height of vegetation/litter where the nest is

2. Are there any other habitat components very close to the nest? If so please specify what and how far away (e.g.: heather, 90cm; grass, 10cm)

3. What best describes the habitat where the nest is (c. 10m around nest):

Dense bracken (the bracken would form a closed canopy with fronds touching/overlapping. There may be an understorey of grass, heath or bracken litter beneath).

Please specify depth of bracken litter if present

Heathland (over 25% cover of heather and/or bilberry, may have scattered bracken and grass)

Grassland (less than 25% cover of heather and bilberry combined, may have scattered bracken)

Mire/wet flush (dominated by rushes and sedges, may contain some heather, bilberry and

4. Within 10m, please record % cover of the following components in the ground layer (e.g. below bracken canopy):

Bracken litter		%	Bilberry		%
Grass		%	Rushes		%
Heather		%	Bare ground		%

Other (specify) _____ %

Habitat detail of territory (use c.100m radius around the nest)

5. Using the DAFOR scale*, describe the frequency of the following habitat components within 100m and give the average height of the vegetation (*DAFOR scale and an interpretation of % cover shown below right)

	<i>DAFOR:</i>	<i>Height:</i>											
Bracken			<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">D - Dominant</td> <td style="width: 50%; text-align: center;">> 75%</td> </tr> <tr> <td>A - Abundant</td> <td style="text-align: center;">51 - 75%</td> </tr> <tr> <td>F - Frequent</td> <td style="text-align: center;">26 - 50%</td> </tr> <tr> <td>O - Occasional</td> <td style="text-align: center;">11 - 25%</td> </tr> <tr> <td>R - Rare</td> <td style="text-align: center;">1 - 10%</td> </tr> </table>	D - Dominant	> 75%	A - Abundant	51 - 75%	F - Frequent	26 - 50%	O - Occasional	11 - 25%	R - Rare	1 - 10%
D - Dominant	> 75%												
A - Abundant	51 - 75%												
F - Frequent	26 - 50%												
O - Occasional	11 - 25%												
R - Rare	1 - 10%												
Bracken litter													
Grass													
Heather													
Bilberry													
Rushes/Sedges													

Appendix 4 (Continued)

Habitat recording form for Whinchat nest sites

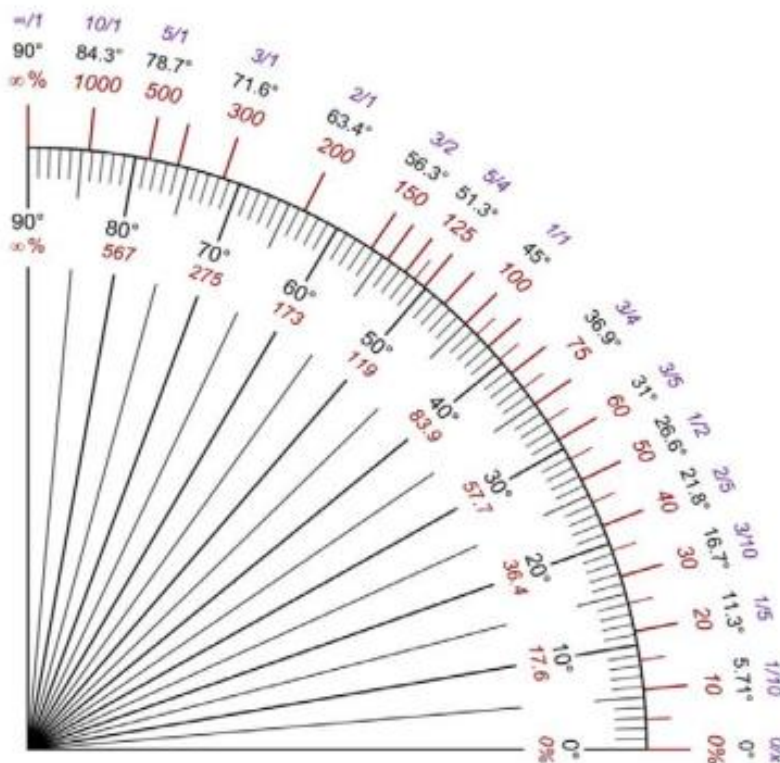
Version 5, May 2019

6. List the nearest water sources (e.g. stream, wet flush) and approximate distance:
7. Approximately how far is the nearest tree to the nest site?:
8. How many trees are within 100m (approximately) of the nest site?:

Aspect and topography

9. If on a slope, what aspect is the nest site facing (e.g. southeast):
10. If on a slope, what is the approximate % gradient (see chart below)?:
11. Any other comments/observations:

Example gradient chart - please record gradient in percent %



**Please ensure that the date and grid reference is completed at the top of the form.
Please take photographs showing the nest site and surrounding habitat.
Please mark the nest, so it can be re-found by the ringer**

Appendix 5. Habitats around nest sites

Nest ref	1. nest built in: (chose all that apply, height cm)						2. features within 50 cms of nest						
	Bilberry	Moss	Bracken litter	Grass	Heather	Moss under bilberry	Bracken	Grass	Heather	Bil-berry	Litter	Bare grass	
AH1	15					3			X				
AH10	30					X	X		X				
AH2	15						X						
AH3	20							<5					
AH5	23					X					X		
AH6	35					17			30				
AH7	10					X	X						
AH8	37					20							
AH9	30						X	X	X				
B1	30	Not recorded						X	X			X	
B2	15					X	X	X					
CB1		20									X		
CG1	20												
CG2		Not recorded					?	?	?	?	?	?	
CG3	30							X	X				
CH1			30							10			
CH2	22					X	X						
CH3			60						X	X			
CMV1			50							X			
CMV10	30						X						
CMV11	35						X						
CMV12	35					X		X			X		
CMV2	30							X			X		
CMV3	30										X		
CMV4		10						X			X		
CMV5	25							X			X		
CMV6		20						X		X	X		
CMV7	15							X			X		
CMV8	20						X						
CMV9	30								X				
LB1			15	5									
LB2	X					X					70		
LB3		X	40										
LB4				40			X						
MB1	15								90				
MB2	25					X	X		X				
TB1		10					X						
TB2				20									
TB3	10												
WM1		15					X			X	X		
Count	27	8	5	3	0	11	14	12	10	6	13	1	
Min	10	10	15	5	0								
Max	37	20	60	40	0								
Average	24	15	39	22	#DIV/0!								

Data from late season visit (PC / CB).

Colour-coded Nest References are two nests built by the same pair (same colour = same pair)

Appendix 5. (Continued)

Nest ref	3. Habitat category 10m around nest				4. habitat composition (% in 10m)							4a Bracken cover % (late summer)
	Bracken (dense)	Heath	Grass	depth of L	Bracken / litter	Grass	Heather	Bilberry	Moss	Rushes	Bare ground	
AH1		X				5	15	80				
AH10					25	15		60				70
AH2		X			10	20	10	60				
AH3		X					20	80	(30)			
AH5		X			25	10	10	50	5			80
AH6		X				5	10	80	(80)		5	
AH7	X				20	5	5	60			10	70
AH8		X			20	5		80				50
AH9		X			20	5		70	5			80
B1		X			15	5	5	30	0	0	2	
B2		X			25	15	15	30	(40)		5	85
CB1	X				25			25	25	25		
CG1		X	X		10	50	10	25		5		
CG2	X				?	?	?	?	?	?	?	
CG3		X				20	10	70				50
CH1		X			60		10	30				
CH2	X				5		5	90				90
CH3	X				50	5	10	30	5			60
CMV1	X				40	10		50				
CMV10	X				20		5	75				75
CMV11	X				10	70		20				95
CMV12	X				20	5	5	70				80
CMV2		X			5	10	5	80				
CMV3	X				50	25		25				
CMV4		X			30	10		40	20			85
CMV5		X			2	8	10	80				25
CMV6	X				35		10	40	15			
CMV7			X		10	60	10	20				
CMV8	X				40	10		50				70
CMV9		X				5	45	45			5	5
LB1	X	X	X	40	30	30	5	30			5	
LB2	X			40	90	5		5				
LB3	X			60	95			5				
LB4			X		2	90		7		1		
MB1		X					15	85				30
MB2		X			1	5	10	85				30
TB1	X				50	40			5		5	85
TB2					70					15	10	75
TB3		X			50	10		30				50
WM1	X			20	30	15	2	10	5	0	0	
Count	17	20	4	4	33	30	24	37	8	4	8	21
Min				20	1	5	2	5	0	0	0	5
Max				60	95	90	45	90	25	25	10	95
Average				40	30	19	11	49	9	8	5	64

Data from late season visit (PC / CB).

Colour-coded Nest References are two nests built by the same pair (same colour = same pair)

Appendix 5. (Continued)

Nest ref	5a. Territory habitat (DAFOR at c.100m)							5a. Territory habitat (height at c.100m)				
	Bracken (summer)	Litter	Bracken (all)	Grass	Heather	Bilberry	Rushes	Bracken	Litter	Grass	Heather	Bilberry
AH1	O	O	O	R	F	A		<100	0	10	30	15
AH10	A	F	A	O	R	A	R	60	>5	>5	35	30
AH2	F	O	F	O	F	D		100	10	10	40	20
AH3		R	R	O	F	A			20	10	30	20
AH5	F	F	F	O	O	F		40	15	5	40	20
AH6				R	O	A				30	30	30
AH7	D	F	D	O	R	D		70	5	5	70	50
AH8	O	F	F	O	O	A		57	50	15	50	40
AH9	F	F	F	O	R	A	O	40	25	<5	25	30
B1	A	O	A	R	R	A		55	2	5	55	30
B2	A	F	A	O	O	A		50	10	10	30	20
CB1		F	F		A	O						
CG1	R	R	R	D	O	A	F		10	2	25	30
CG2	D	F	D	O	O	O	O	100	5	5	30	20
CG3	O	R	O	O	O	A	O	50	30	3	40	30
CH1		A	A	O	O	A	R		30	5	30	30
CH2	A	F	A	R	R	O		48	10	10	40	30
CH3	A		A	R	R	O	R	60		5	90	20
CMV1		D	D	A	F	A	O		35	3	50	35
CMV10	A	O	A	R	R	D	R	50	30	1	40	30
CMV11	D	O	D	A	R	F	R	50	30	3	50	30
CMV12	D	R	D	F	O	F	F	50	30	3	40	30
CMV2		R	R	O	O	D			40	2	50	30
CMV3		D	D	F	R	A	A		40	3	50	40
CMV4		F	F	A	A	A			40	3	50	30
CMV5		R	R	O	F	D			40	3	50	30
CMV6		A	A		F	A			40		50	30
CMV7		F	F	D	O	O	F		30	3	50	20
CMV8	A	R	A	R	O	O	R	40	20	3	30	20
CMV9	F	R	F	O	A	A	R	50	30	1	45	30
LB1		A	A	O	O	F	R		40	5	30	20
LB2		D	D	R		O			50	5		20
LB3	O	O	O	R		R		90	60	5		20
LB4	D	R	D	O		R	F					
MB1				O	O	D	O			7	50	15
MB2	R		R	R	O	D		15		30	25	
TB1	F	F	F	F				40	30	5		
TB2		D	D	R			O		45	5		
TB3	F	D	D	R		O		40	30	5		10
WM1	A	F	A	O	R	O	F	80	20	5	80	30
Count	25	36		38	34	38	20	23	34	37	33	35
Min								15	0	1	25	10
Max								100	60	30	90	50
Average								56	27	7	43	27

Data from late season visit (PC / CB).

Colour-coded Nest References are two nests built by the same pair (same colour = same pair)

Appendix 6. Physical Attributes of Nest Sites

Data recorded by nest finders using the Form in Appendix 4.

Nest Reference	Elevation	Nearest water (m)			Nearest Trees		Aspect	Gradient (degrees)
		Stream	Flush	Either (nearest)	Nearest (m)	No. within 100m		
AH1	454	100		100	100	1	E	60
AH10	444	?			25	3	SSE	50
AH2	440	8		8	15	3	S	20
AH3	463	63		63	130	0	NNW	45
AH5	459	150	12	12	36	1	SW	10
AH6	387	?			?	2	NNW	30
AH7	432	5		5	25	3	S	10
AH8	462		25	25	129	0	NNW	5
AH9	445		?		10	2	NNE	15
B1	452	45		45	75	1	S	40
B2	?		28	28	73	3	NW	11
CB1	434							
CG1	434		10	10				
CG2	427		5	5	40	2	E	40
CG3	?	30	30	30	100	2	W	12
CH1	?	50		50	20	10	NE	32
CH2	417	37		37	25	19	NNW	23
CH3	420	80		80	45	5	SE	11
CMV1	416	30	15	15	200	0	SE	10
CMV10	458	25		25	30	8	SE	45
CMV11	430	40		40	100	1	SW	45
CMV12	438	30	20	20	25	1	SE	15
CMV2	462	75		75	150	0	SSW	30
CMV3	455		10	10	150	0	S	30
CMV4	455		10	10	250	0	na	0
CMV5	465	75	45	45	150	0	SSW	20
CMV6	446	10		10	50	2	SW	40
CMV7	?	30	25	25	30	1	SE	5
CMV8	433	250		250	10	15	SSE	45
CMV9	398	25		25	8	8	S	60
LB1	403	30		30	30	4	N	25
LB2	379	150		150	15	6	N	22
LB3	?							
LB4	418		15	15	10	6	N	27
MB1	356	50	60	50	30	6	SSW	22
MB2	416		36	36	62	11	SSW	11
TB1	391	50		50	>100	0	NNW	27
TB2	309		1	1	50	4	NW	40
TB3	339	75		75	200	0	NE	27
WM1	328	30			150	0	SE	15
Summary								
Count	35	28	17	34	37	27	37	36
Minimum	309	5	1	1	8	0		0
Maximum	465	250	60	250	250	19		60
Average	422	59	22	43	73	4		26

Colour-coded Nest References are two nests built by the same pair (same colour = same pair)

Appendix 7. Population Model

Based on Survival Data on the BTO Website, and Fledged Young per Pair Found in 2021. This assumes that 2021 data is typical. Project results in future years will refine the predictions of the model, which will be extended to the whole population, not just the 32 pairs found by the project.

2021 Project Results

Adult breeding birds (32 pairs)	64
Chicks ringed (successful nests)	114
Number of successful nests	21
Average fledged young / successful nest	5.43
Average fledged young /pair	3.56

Whinchat Survival (Bird Facts, BTO website)

Adult	0.47
Juvenile (first year)	0.34
Typical age of first breeding	1

Year	1	2	3	4	5	6	7
Adult birds from year 1	64	30	14	7	3	1	0
Chicks fledged in year 1 joining breeding population		39	18	8	4	2	1
Chicks fledged in previous year joining breeding population			39	18	8	4	2
Chicks fledged in previous year joining breeding population				39	18	8	4
Chicks fledged in previous year joining breeding population					39	18	8
Chicks fledged in previous year joining breeding population						39	18
Chicks fledged in previous year joining breeding population							39
Total birds	64	69	71	72	72	72	72
Total pairs	32	34.5	35.5	36	36	36	36

Appendix 8. Project Outputs

Quantified Outputs	2021
1. Whinchat nests found	40
2. Nest site habitat recording forms completed	76
By nest finders, when nest found	37
Late season (July - August) visits by NT staff	39
3. Successful nests	24
Productivity (% success of All 40 nests)	60%
Productivity (% success of final nest of 32 pairs)	75%
4. Number of chicks fledged (estimated minimum)	114
5. Whinchats colour-ringed	131
Adults caught (all males)	5
Chicks in the nest	126
6. Area of bracken managed for Whinchat (experimental)	0.15ha

Record of Volunteer Hours

Initials of Volunteer	Additional unpaid Nest Finding	Ringling (Andy Spencer)*	Assisting the ringer	Travel Time	Total
TG	0.0		2.0	9.0	11.0
JG	33.5		10.0	15.0	58.5
MH	15.5		6.0	26.0	47.5
PJ	13.0		4.0	12.0	29.0
AS	36.0	39.0		10.0	85.0
DS	122.0		18.0	10.0	150.0
DW	17.0		4.0	14.0	35.0
	237.0	39.0	44.0	96.0	416.0

Contributions in kind (National Trust Staff)

Debby Santry (GIS Officer)

Peter Carty (Countryside Parkland and Gardens manager, South Shropshire)

Charlie Bell (Stepping Stones Project Officer)

Andy Perry (Ecologist)

This does not include more than 500 hours contributed by 10 Volunteers working on the Long Mynd Breeding Bird Survey, which is mapping several upland species, including Whinchat.

These volunteers contributed the records of 20 additional pairs (the green dots on Map 2 and subsequent maps).