A survey of ground-nesting birds in the New Forest National Park in spring 2020, to assess potential impacts of reduced recreational use

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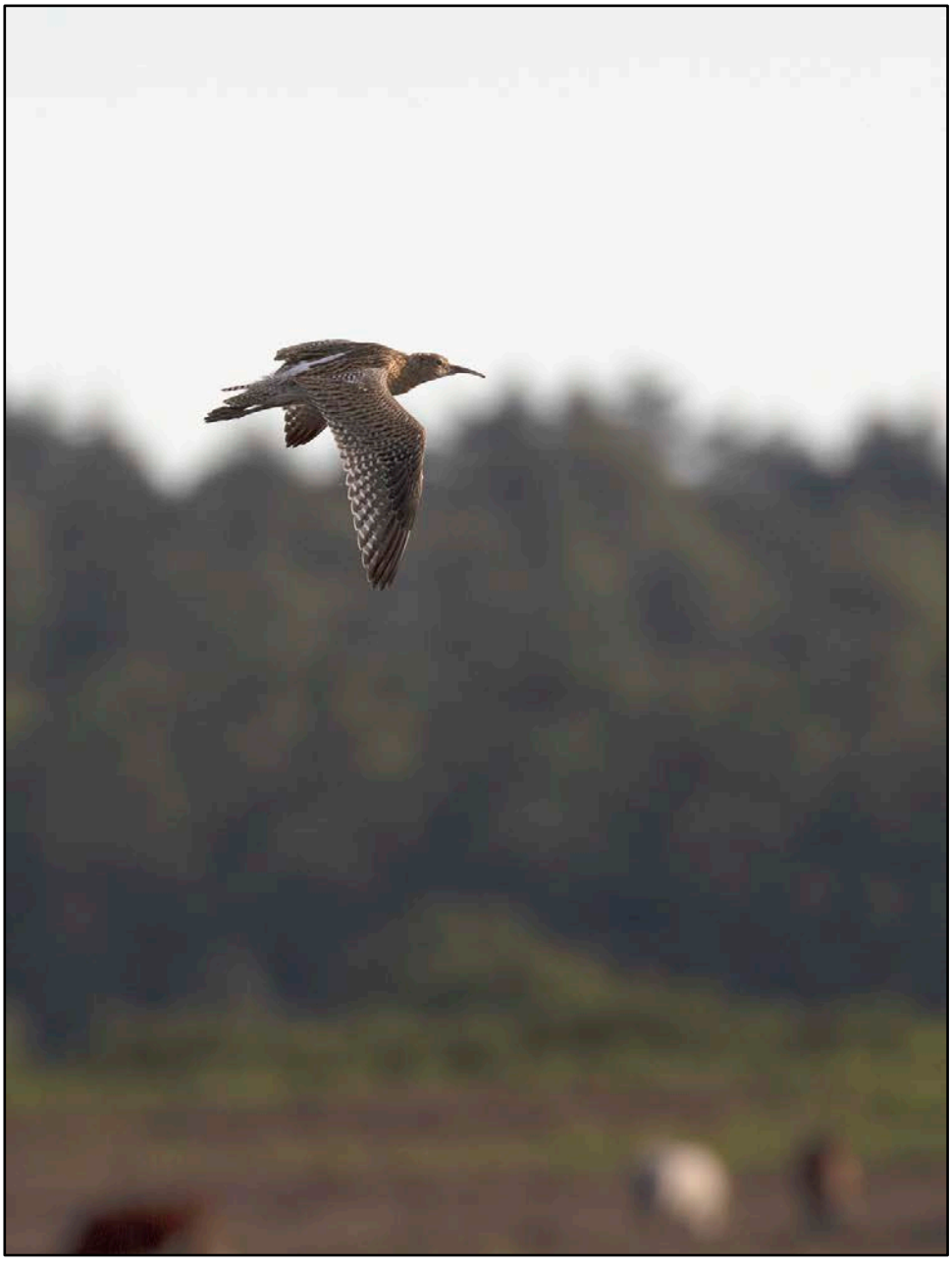

Juvenile Curlew at Shatterford, taking its first flights after fledging

Wild New Forest

Executive Summary

- In spring 2020, the initiation of access restrictions in the New Forest on 23 March, as part of nationwide COVID-19 lockdown measures, provided a rare opportunity to assess whether reduced recreational use and associated disturbance would lead to changes in the distribution, behaviour and productivity of breeding waders in the New Forest Special Protection Area (SPA).

- Fieldwork was conducted over three separate visits between 10 Apr and 15 June 2020, totalling over 400 hours of effort. All suitable wader habitat in 15 pre-defined areas, covering 106 one-kilometre squares and some additional contiguous habitat, was covered by two surveyors walking a total distance of 1000 km.

- The results indicate that the breeding wader assemblage in the New Forest SPA is currently in the order of 270 territories, representing a major decline compared to previous surveys over the last three decades that all recorded between 340 and 400 territories; this change in status has mostly been driven by declines in the Curlew and Lapwing population to 48 and 61 territories, respectively, as Snipe numbers appear stable at 151 territories and Redshank numbers have remained relatively low with just seven territories in 2020.

- Although a detailed assessment of wader productivity was outside the scope of this survey, additional fieldwork was undertaken in June and July as part of a wider effort to monitor Curlew productivity, co-ordinated by Forestry England. No more than four Curlew nests generated fledged chicks, consistent with data from previous years – this poor productivity is clearly a major driver of the observed population decline. Lapwing productivity also appeared to be rather low, although more chicks and fledglings were observed than for Curlew, no doubt aided by their ability to make multiple nesting attempts in a season. All Redshank breeding attempts are known to have failed. Snipe fledging success was not monitored due to practical constraints.

- Based on this and other recent research conducted in 2016-18, the primary controls on wader populations, distributions and productivity in the New Forest SPA are considered to be 1) management and grazing regimes, 2) predation of eggs, chicks and occasionally adults, 3) acute and persistent hydro-meteorological phenomena, and 4) recreational disturbance.

- Recreational disturbance was observed to be a persistent issue in some areas, particularly in the southern New Forest close to settlements and tourist hubs; numbers of observed recreational users almost doubled after access restrictions were eased on 11 May 2020, at a time when many ground-nesting birds were nesting, and there was evidence for breeding waders being negatively impacted by the influx of recreational users in several areas, e.g. Hatchet Pond.

- However, the earlier period of access restrictions and associated car park closures, as well as seasonal and extended car park closures in locations close to breeding wader territories, were observed to have a positive impact on Curlew distribution, behaviour and (potentially) productivity; Curlews were observed utilising habitats adjacent to closed car parks and in areas with high recreational use (e.g. extensive lawns) throughout the March-to-July breeding cycle, that would normally have been avoided in previous years.

- The heterogenous distribution of all four wader species is shown to be closely tied to their specific habitat requirements, with distinct clusters in some areas; future management interventions could therefore benefit from focussing on areas where these clusters are shown to overlap with high densities of potential predators and recreational users, e.g. Beaulieu Heath (East and West).

1. Introduction

The New Forest Special Protection Area (SPA) designation includes two species of ground-nesting bird, Nightjar and Woodlark, on account of the site holding >1% of the UK population of both species. The assemblage of breeding waders in the New Forest, including Curlew, Lapwing, Snipe and Redshank, is also listed as a notable feature of the site (e.g. Conway et al., 2010). These ground-nesting birds have experienced contrasting fortunes since the updated SPA citation in 1992, with the most recent survey data in 2018-19 indicating that the populations of Nightjar and Woodlark have increased overall (albeit with some fluctuations) whereas the breeding wader assemblage has decreased (see review in Lake et al., 2020).

Recreational disturbance has been identified as one of the most significant potential pressures on ground-nesting birds in the New Forest (e.g. Sharp et al., 2008; Liley and Lake, 2015), although predation, grazing levels, climate change and acute hydro-meteorological events are also thought to impact population size, distribution, and productivity.

In England, access restrictions to open areas associated with the COVID-19 outbreak were imposed on 23 March 2020. Although the duration of this 'lockdown' was not known at the time, it appeared to provide a unique opportunity to assess how ground-nesting birds might react when recreational pressure was drastically reduced. The intention was to test the hypothesis that **reduced recreational use and associated disturbance during the early part of the ground-nesting bird breeding season would lead to changes in bird distribution, behaviour and productivity**. The full lockdown was actually in place for just seven weeks, with most access restrictions easing on 11 May 2020. However, the lockdown period coincided with the time when many ground-nesting birds were establishing territories and commencing nesting. Due to limited opportunities for other recreational activities, the easing of lockdown resulted in an unprecedented influx of visitors to the New Forest in the later stages of the breeding season.

In order to test the above hypothesis, a detailed survey of breeding waders in the New Forest was commissioned by Forestry England and undertaken by Wild New Forest in spring 2020, with a particular focus on territory mapping, habitat use and evidence of pressures, e.g. predators and recreational disturbance. The timing of 'lockdown' initiation, on 23 March 2020, and commencement of fieldwork on 10 April 2020, was too late to include Woodlark in the survey, and the relaxing of access restrictions on 11 May 2020 meant that it was not possible to include Nightjar as they had yet to commence breeding. However, territories of Woodlark and other diurnal SPA species were mapped and provided to Forestry England.

This report initially describes survey methods and effort, before detailing the results from each area and then for each of the four wader species in turn. Most of the data are tabulated, but all relevant anecdotal information has been included to support management decisions at the site level. The main findings are then discussed in more detail in the analysis section, which, combined with the executive summary, provides an overview of key results and a test of the hypothesis listed above. Detailed location data, in the form of grid references and base maps for each visit to each area, are available in the appendices.

2. Methods

A total of 106 pre-determined one-kilometre squares in 15 areas was successfully surveyed by RW and MW; the 15 areas were previously defined during surveys conducted by Wild New Forest and Forestry England in 2016-18, and cover the majority of suitable habitat for breeding waders within the New Forest SPA (while also helping to break down the survey area into manageable blocks). A further two one-kilometre squares were included in the 2020 survey (Area 16) due to their importance for breeding Snipe. All suitable habitat within survey areas was covered over three separate visits using the methodology outlined below. Areas of contiguous habitat extending beyond defined survey areas were also covered when it was deemed sensible to do so, up to a maximum of 0.5 km from the defined survey area. Consequently, the actual area covered was significantly greater than 106 km^2. Based on previous work co-ordinated by Wild New Forest and Forestry England (Wynn, 2020), there was high confidence that this survey coverage included all Curlew and Redshank territories within the National Park boundary, and almost all Lapwing and Snipe territories. Although the primary purpose of the survey was to assess the effects of reduced visitor pressure, the methodology used was closely aligned to recent New Forest Higher Level Stewardship (HLS) surveys to allow direct comparison of population estimates for breeding waders.

All survey squares received three visits as follows: Visit 1 between 10 and 25 April 2020; Visit 2 between 26 April and 15 May 2020; Visit 3 between 16 May and 15 June 2020. Survey work was restricted to the early morning and evening periods (generally within three hours of sunrise and two hours of sunset), on days when weather conditions were suitable for detecting calling and displaying waders; surveys were not conducted during wet and/or windy weather, i.e. wind speeds >20mph. A small number of additional visits were made to 'core

areas' after 15 June 2020 to assess productivity, particularly of Curlew – these core areas included Areas 2, 10, 13 and 15 where multiple Curlew pairs were breeding.

Surveyors attempted to cover all suitable habitat within each survey square, including within 50 m of any permanently wet (and therefore inaccessible) areas. A risk assessment for the survey, particularly regarding hazards associated with wetland habitats, can be found in Appendix C. Surveyors entered all accessible boggy areas in an attempt to flush any non-vocalising Snipe that might present (Fig. 2.1), but were particularly sensitive around Curlew, Lapwing and Redshank territories in order to avoid prolonged and unnecessary disturbance. The two surveyors (RW and MW) corresponded on a daily basis to ensure a consistent approach to surveys, and also regularly liaised with AP who, in parallel, was conducting detailed studies of Curlew and Lapwing productivity based upon nest-finding and chick monitoring.

The combined experience of this survey team regarding breeding waders in the New Forest was vital for accurate definition of breeding wader territories, especially for mobile species such as Curlew and Redshank whose populations appear to have been over-estimated in some previous surveys. For this study, a confirmed territory was defined as a discrete area of suitable habitat where birds were noted vocalising and/or displaying on multiple dates (Fig. 2.1). Confirmed breeding represented direct observation of an incubating bird and/or the nest and/or chicks, including associated defensive behaviour. Any non-breeding birds, including those flying over, were also noted but not included in population estimates. Some flexibility in the application of these criteria was applied by the survey team, based upon their knowledge of the species and each area surveyed.

All territories and non-breeding birds were mapped in the field and transferred to digital base maps later the same day - base maps for each visit are available in Appendix A. All territories were mapped at minimum six-figure grid reference resolution and are listed in Appendix B. At the conclusion of the survey, summary maps of all territories in each survey area were produced and are provided here in Section 3.2, while summary maps of territories for each species are provided in Section 3.3.

To assess pressures on breeding waders, all potential predators and recreational activities were recorded during surveys; the latter included numbers of people, type of activity, and any accompanying dogs/horses/bikes, as well as details of any incidents of direct disturbance to breeding waders. This information enabled a crude assessment of the level of visitor pressure at different sites during and immediately after the period of access restrictions.

***Fig. 2.1**: Male Snipe in display flight, showing the spread tail feathers that are used to make the drumming sound that is such a feature of the New Forest wetlands in spring*

3. Results

3.1. Survey effort

Key metrics that define survey effort are provided in Table 3.1, including the number of field-hours for each series of visits, and the distance walked. Values provided in the 'Extra' column correspond to visits undertaken after 15 June 2020 to monitor breeding wader productivity. In total, survey effort involved just over 400 hours and 1000 km of distance walked and was broadly consistent over the three visits (±10%). Dry, settled conditions dominated during the survey period, and there was no significant weather downtime, while the initially wet conditions underfoot rapidly dried through April and May. Wild New Forest are committed to reducing their carbon footprint during survey and monitoring activities, and therefore seek to minimise car-based travel to/from survey sites wherever possible. In addition, potential sensitivity around continued access to the New Forest during lockdown was also a factor in minimising car use during this particular survey. The final totals in Table 3.1 indicate that the majority (53%) of the 4170 km travelled to/from survey sites in support of this study was undertaken without using a car.

	Visit 1	Visit 2	Visit 3	Extra	Total
Hours	118.5	113	131.5	38.5	**401.5**
Distance walked (km)	333	291	308.5	84.5	**1017**
Bike travel (km)	732	651.5	685	160	**2228.5**
Car travel (km)	665	574	655	48	**1942**

Table 3.1*: Survey effort and distance covered during Visits 1-3, and during subsequent visits to 'core areas' after 15 June to monitor productivity.*

3.2. Summary maps, totals and pertinent observations for each survey area

The following section contains detailed information on visit schedule, numbers of breeding waders, potential predators, and recreational users in each area, together with summary maps showing all breeding wader territories. The colour-coded key shown on each map represents the following:

- Filled circle = confirmed breeding, i.e. nest or chicks seen
- Open circle = occupied territory, i.e. vocalising or displaying male/pair
- Cross = non-breeding and non-territorial bird, e.g. flying over

For those waders confirmed as breeding, letters within the circle indicate fledged young (FL), a cross indicates breeding failure (X) and numbers indicate number of chicks seen (where known).

3.2.1. Area 1 (Setley Plain and Hinchelsea Bog)

Surveyor: Marcus Ward

One-kilometre squares: 5

Visit 1	Visit 2	Visit 3
11/04/20 (1800-2000)	27/04/20 (1815-2015)	21/05/20 (0530-0830)
12/04/20 (0630-0930)	29/04/20 (0600-0900)	21/05/20 (1900-2100)

Table 3.2.1A *Dates and times of each survey session during Visits 1-3 in Area 1*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	1	1	2	2
Lapwing	5	1	3	5
Snipe	7	10	4	11
Redshank	0	0	0	0

Table 3.2.1B*: Numbers of breeding wader territories in Area 1*

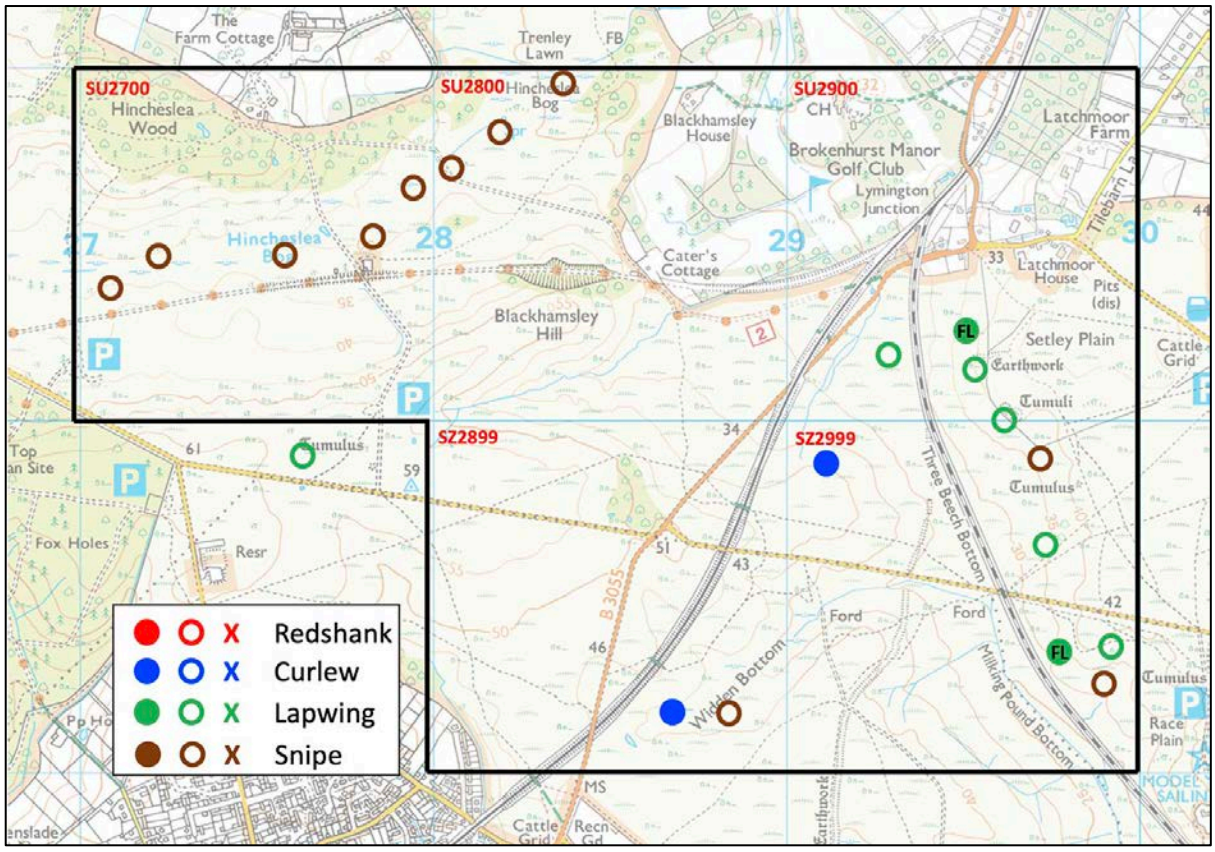

Fig. 3.2.1A*: Summary map showing wader (and other notable bird territories) in Area 1*

Area 1 comprises a mix of habitats including damp heathland, shallow valley mires and an extensive reedbed at Hincheslea Bog. It is located in a relatively busy area in the southern New Forest, bisected by two railway lines and crossed by two roads (Fig 3.2.1A), and

sandwiched between Sway and Brockenhurst; it is therefore a popular destination for local dog-walkers.

Breeding waders included two pairs of Curlew, at Widden Bottom and Three Beech Bottom. The Three Beech Bottom pair were initially settled in the Setley Pond and Milking Pound Bottom area, however suitable habitat is limited there, and they eventually settled at Three Beech Bottom. The Widden Bottom pair were also observed commuting to Setley Pond/Milking Pound Bottom on a number of occasions, apparently to feed. Both pairs failed during the egg stage, neither going for a second attempt. A total of 11 Snipe territories were mapped, eight of which were recorded along the length of Hinchelsea Bog where multiple drumming and chipping Snipe were frequently observed (Fig. 3.2.1B), necessitating careful fieldwork to define individual territories. At least five pairs of Lapwing made a minimum of eight breeding attempts in the area (Fig. 3.2.1A), with two successfully hatching chicks - at least one brood of two survived to fledge with the youngsters frequently observed feeding at the roadside 200m northwest of Setley Pond car park.

***Fig. 3.2.1B**: Prime Snipe habitat at the northeast end of Hincheslea Bog, with open damp grassland, areas of standing water, and tussocks of sedge/rush and bog myrtle*

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	0	0	0	0
Carrion Crow	7	6	7	20
Buzzard	1	0	0	1
Other	0	0	0	0

***Table 3.2.1C**: Numbers of potential predators observed in Area 1*

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	23 (19 dogs)	22 (22 dogs)	40 (18 dogs)	85 (59 dogs)
Walker	0	2	1	3
Runner	0	0	0	0
Cyclist	2	1	3	6
Horse-rider	2	0	2	4
Other	0	0	0	0

***Table 3.2.1D**: Numbers of recreational users observed in Area 1*

The tables above show that numbers of avian predators were relatively low, and no mammalian predators were observed. However recreational disturbance is significant as this is a popular location for dog walkers - the majority appear to be locals from Sway and Brockenhurst, although one dog walker encountered during lockdown said he had driven down from Oxford for a walk with his dog! A notable increase in dog walkers was recorded during Visit 3 after access restrictions were lifted; significant disturbance was observed around the margins of Hinchelsea Bog, in particular at the crossing points. In contrast, the locations where the Curlews nested (Three Beech Bottom and Widden Bottom) were relatively quiet as there is no direct access from car parks.

3.2.2. Area 2 (North and South Weirs, and Duckhole and Holmhill Bogs)

Surveyor: Marcus Ward

One-kilometre squares: 9

Visit 1	Visit 2	Visit 3
12/04/20 (1800-2000)	29/04/20 (1830-2030)	24/05/20 (0530-0900)
13/04/20 (1800-1900)	01/05/20 (1830-2030)	25/05/20 (0530-0830)
14/04/20 (0630-0930)	02/05/20 (0600-0900)	26/05/20 (1900-2100)

***Table 3.2.2A**: Dates and times of each survey session during Visits 1-3 in Area 2*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	2	2	2	2
Lapwing	1	2	1	2
Snipe	6	17	18	21
Redshank	0	0	0	0

***Table 3.2.2B**: Numbers of breeding wader territories in Area 2*

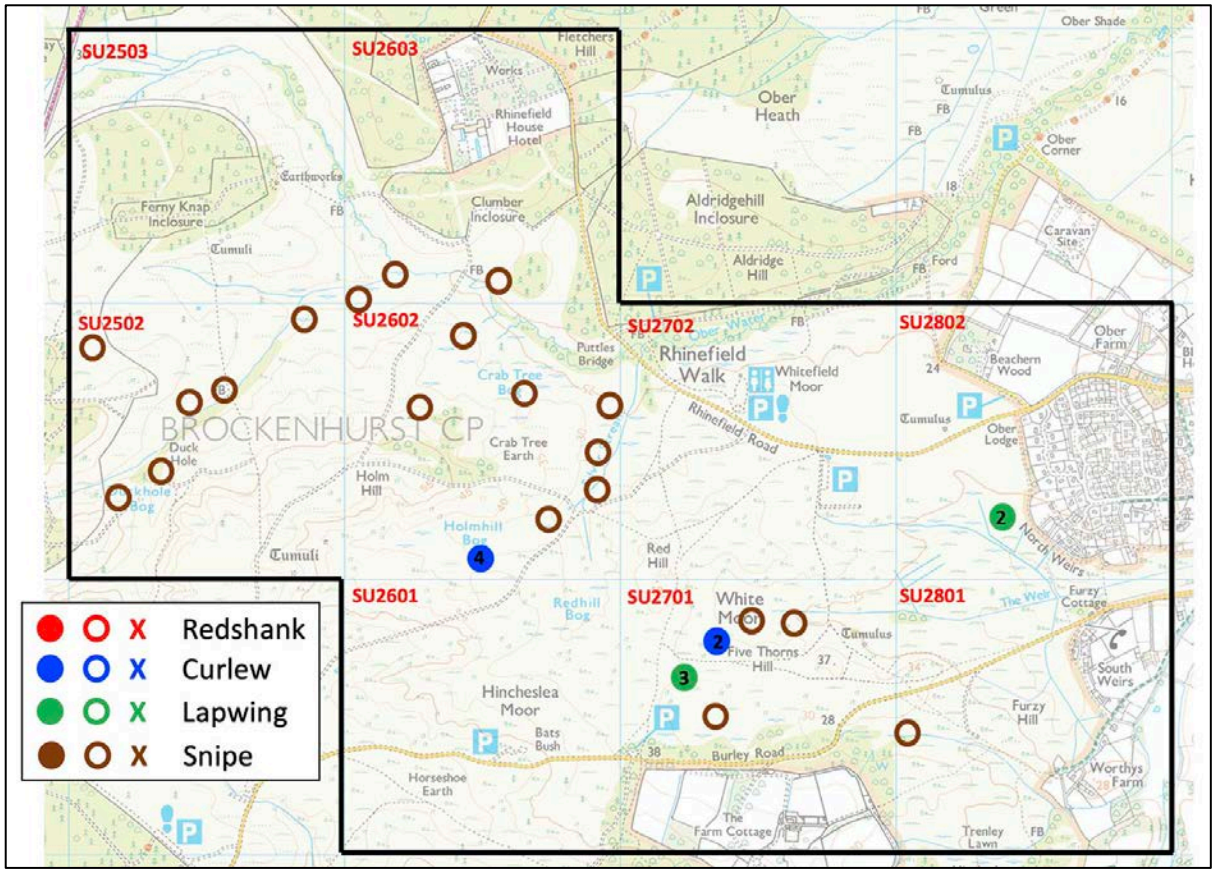

***Fig. 3.2.2A**: Summary map showing wader (and other notable bird territories) in Area 2*

Area 2 comprises a broad mix of habitats including large areas of lawn (e.g. Whitefield Moor and Wilverley Plain), both dry and damp heathland, and two extensive valley mires that include some small areas of reedbed (Fig. 3.2.2B). Bordering the western fringe of Brockenhurst, it is popular with locals and tourists alike. The area is crossed by two minor, yet busy roads, and is serviced by seven car parks (Fig. 3.2.2A), including the busy 'honey pot' sites at Whitefield Moor and Wilverley Plain.

***Fig. 3.2.2B**: Photo of Duckhole Bog showing the mosaic of wetland habitats favoured by breeding Snipe in particular – at least 16 territories were located in two one-kilometre squares containing this habitat (see Fig. 3.2.2A).*

Breeding waders included two pairs of Curlew, at Five Thorns Hill and Holm Hill, both of which successfully hatched young (two and four chicks, respectively). A third (un-mated) Curlew held territory for a short while in the Duck Hole area but didn't settle. Of the hatched chicks, the brood of four from Holm Hill Bog were lost to predation by 19 June, seven days after hatching, while the Five Thorn Hill pair had one chick survive through to at least 07 July, 39 days after hatching; it is therefore possible that this chick fledged. A total of 21 Snipe territories were mapped across the area, the largest total for any of the areas covered by the survey. The largest concentration occurs along Duckhole Bog and Silver Stream (Fig. 3.2.2A and B). Two pairs of Lapwing hatched broods at North Weirs and White Moor, and were seen with two and four chicks, respectively, however, none were present on the Visit 3 suggesting that all succumbed to predation.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	0	3	0	3
Carrion Crow	23	28	16	67
Buzzard	2	3	1	6
Other	0	0	0	0

***Table 3.2.2C**: Numbers of potential predators observed in Area 2*

Of the avian predators, Carrion Crow numbers were relatively high and tended to involve congregations around livestock on lawns, although after access restrictions were lifted the livestock appeared to be displaced by visitors, which resulted in the corvids being more widespread across the area. A Buzzard nest found at Duck Hole was most likely responsible for the majority of sightings of that species, while Ravens were encountered over the area commuting from a presumed nest site in the Rhinefield area. A Hen Harrier was reported to be hunting in the area in early May.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	29 (15 dogs)	21 (22 dogs)	28 (21 dogs)	78 (58 dogs)
Walker	0	2	2	4
Runner	2	1	0	3
Cyclist	3	1	3	7
Horse-rider	1	0	0	1
Other	0	0	0	0

***Table 3.2.2D**: Numbers of recreational users observed in Area 2*

Recreational disturbance is significant as this is a popular location for dog walkers and tourists largely originating from large car parks at Wilverley and Whitefield Moor. A number of instances of dogs running through Holmhill and Redhill Bogs were noted and the owners responsible were approached on numerous occasions - in most cases they proceeded to control their dog but unfortunately a small minority refused to follow advice. A handful of regular dog walkers that had unruly dogs were approached and they agreed to use different routes for the duration of the breeding season.

3.2.3. Area 3 (Holmsley, Clayhill, Mill Lawn and Red Rise)

Surveyor: Marcus Ward

One-kilometre squares: 11

Visit 1	Visit 2	Visit 3
14/04/20 (1800-2000)	02/05/20 (0600-0900)	27/05/20 (1930-2100)
15/04/20 (0630-0930)	04/05/20 (0600-0900)	31/05/20 (1930-2100)
15/04/20 (1800-2000)	04/05/20 (1830-2000)	01/06/20 (0600-0830)
19/04/20 (1800-2000)	05/05/20 (0600-0800)	02/06/20 (0530-0900)
20/04/20 (1800-2000)	14/05/20 (0600-0900)	

***Table 3.2.3A**: Dates and times of each survey session during Visits 1-3 in Area 3*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	1	2	3	3
Lapwing	7	5	3	8
Snipe	15	11	13	15
Redshank	0	0	0	0

***Table 3.2.3B**: Numbers of breeding wader territories in Area 3*

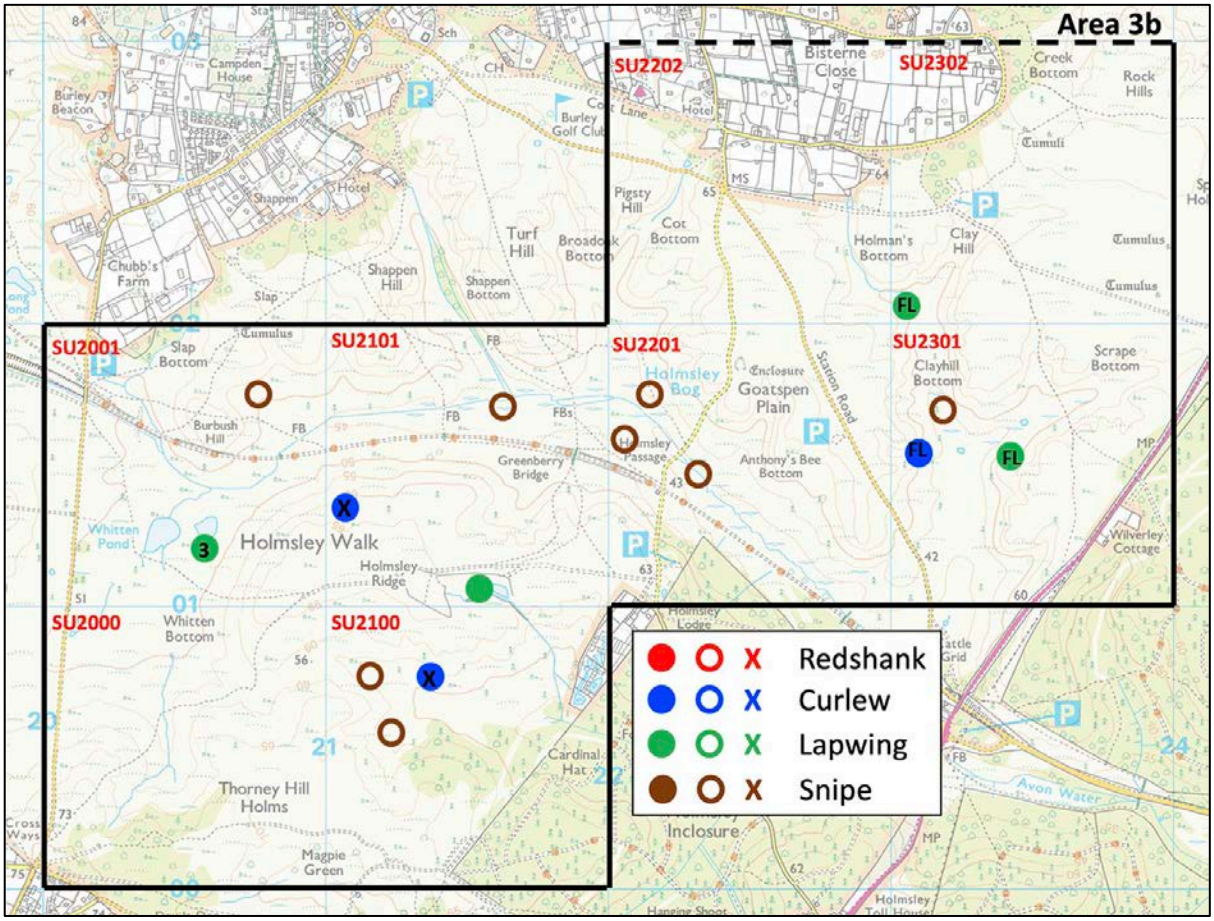

***Fig. 3.2.3A**: Summary map showing wader (and other notable bird territories) in Area 3a*

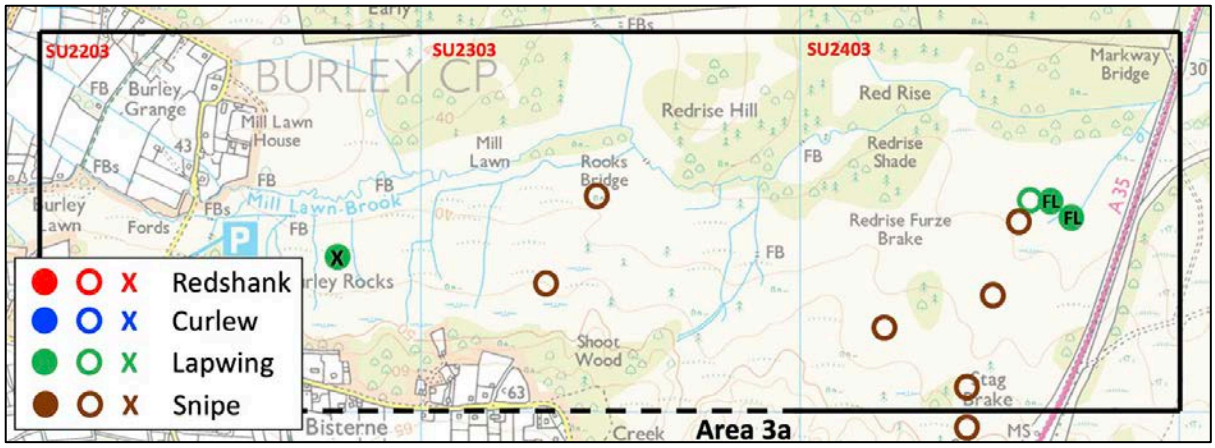

***Fig. 3.2.3B**: Summary map showing wader (and other notable bird territories) in Area 3b*

Area 3 has been divided in two for mapping purposes as it is a relatively large area; the southern part of the area comprises a broad mix of habitats dominated by Holmsley Ridge and Goatspen Plain, and the adjacent valley mires of Holmsley Bog and Clayhill Bottom (Fig. 3.2.3A). The Mill Lawn Brook and its floodplain dominates the northern part of the area, with seepage mires creating extensive areas of densely vegetated bog (Fig. 3.2.3B). Although close to the tourist centre of Burley, much of the area has limited access points ensuring relatively low footfall with most traffic concentrated on the old railway line (now cycle path) that bisects the area and the popular path along Holmsley Ridge.

Three Curlew territories were mapped, including a pair either side of Holmsley Ridge. The pair on the south side failed early but apparently didn't re-lay despite adults remaining in the area, while the pair to the north were predated close to hatching. A third pair nested in Clayhill Bottom and two newly hatched chicks were observed on 02 June - adults remained in the area until at least 02 July, although the final outcome is unknown. A total of 15 Snipe territories were mapped across the area with two distinct concentrations at Holmsley Bog (five territories) and Stag Brake / Redrise (five territories). At least eight pairs of Lapwing were mapped, with successful hatching at Whitten Pond (1 pair), Clayhill Bottom (2 pairs) and Red Rise (2 pairs) while the outcome of a pair in the quarry on Holmsley Ridge is unknown. Well grown, fledged young were later recorded at Whitten Pond and Red Rise.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	0	0	0	0
Carrion Crow	15	13	12	40
Buzzard	5	4	2	11
Other	0	0	0	0

***Table 3.2.3C**: Numbers of potential predators observed in Area 3*

Numbers of avian predators were relatively low while no mammalian predators were observed. Breeding Buzzards to the south of the area accounted for the majority of records of that species.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	17 (19 dogs)	3 (5 dogs)	11 (8 dogs)	31 (32 dogs)
Walker	7	2	7	16
Runner	0	0	0	0
Cyclist	5	0	1	6
Horse-rider	0	2	0	2
Other	0	Low-flying helicopter	0	1

***Table 3.2.3D**: Numbers of recreational users observed in Area 3*

Numbers of recreational users were also relatively low, no doubt helped by the fact that the official car parks at Clay Hill and Burbush remained closed even after access restrictions were lifted due to the presence of breeding waders; the Redrise area was also especially quiet. Most walkers encountered were taking the circular route from Holmsley along the ridge and back via the old railway line - although this route passes close to both Curlew and Lapwing territories no issues were observed.

3.2.4. Area 4 (Dur Hill and Cranes Moor)

Surveyor: Marcus Ward

One-kilometre squares: 8

Visit 1	Visit 2	Visit 3
17/04/20 (0600-0830)	02/05/20 (1815-2045)	04/06/20 (0600-0830)
17/04/20 (1800-2000)	05/05/20 (1830-2000)	04/06/20 (1945-2115)
18/04/20 (1745-1845)	07/05/20 (0600-0900)	06/06/20 (1930-2130)
19/04/20 (0600-0900)	07/05/20 (1830-2030)	08/06/20 (0600-0830)
	12/05/20 (1930-2030)	08/06/20 (1930-2100)

***Table 3.2.4A**: Dates and times of each survey session during Visits 1-3 in Area 4*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	5	5	4	6
Lapwing	0	2	1	3
Snipe	5	3	5	10
Redshank	0	0	0	0

***Table 3.2.4B**: Numbers of breeding wader territories in Area 4*

Area 4 is dominated by large areas of permanently wet mire and is therefore one of the most challenging areas to access; it is bisected by the dismantled railway and has limited access points.

Seven pairs of Curlew were mapped making it an important area for the species, unfortunately none managed to fledge any young. A pair each on the north and south side of Dur Hill Down managed to hatch young but both sets of chicks were ultimately predated. One pair on Bisterne Common failed during the egg stage, while a pair at Kingston Great Common also hatched young that were lost soon after hatching. Two territories were mapped on Cranes Moor, with a third pair identified by AP on the eastern edge of Cranes Moor; the male of the pair had a deformed leg and the eggs were infertile, presumably a result of the male being unable to successfully copulate due to the damaged leg. A total of 10 Snipe territories were widely spread across the area in suitable habitat (sheltered damp bog with adjacent open areas with exposed substrate for feeding). Three pairs of Lapwing were recorded, one pair in residence throughout on Cranes Moor and two pairs including sitting females at Bisterne Common on Visit 2, however just one (apparently un-paired) male was in the area on Visit 3, suggesting the nests had been predated.

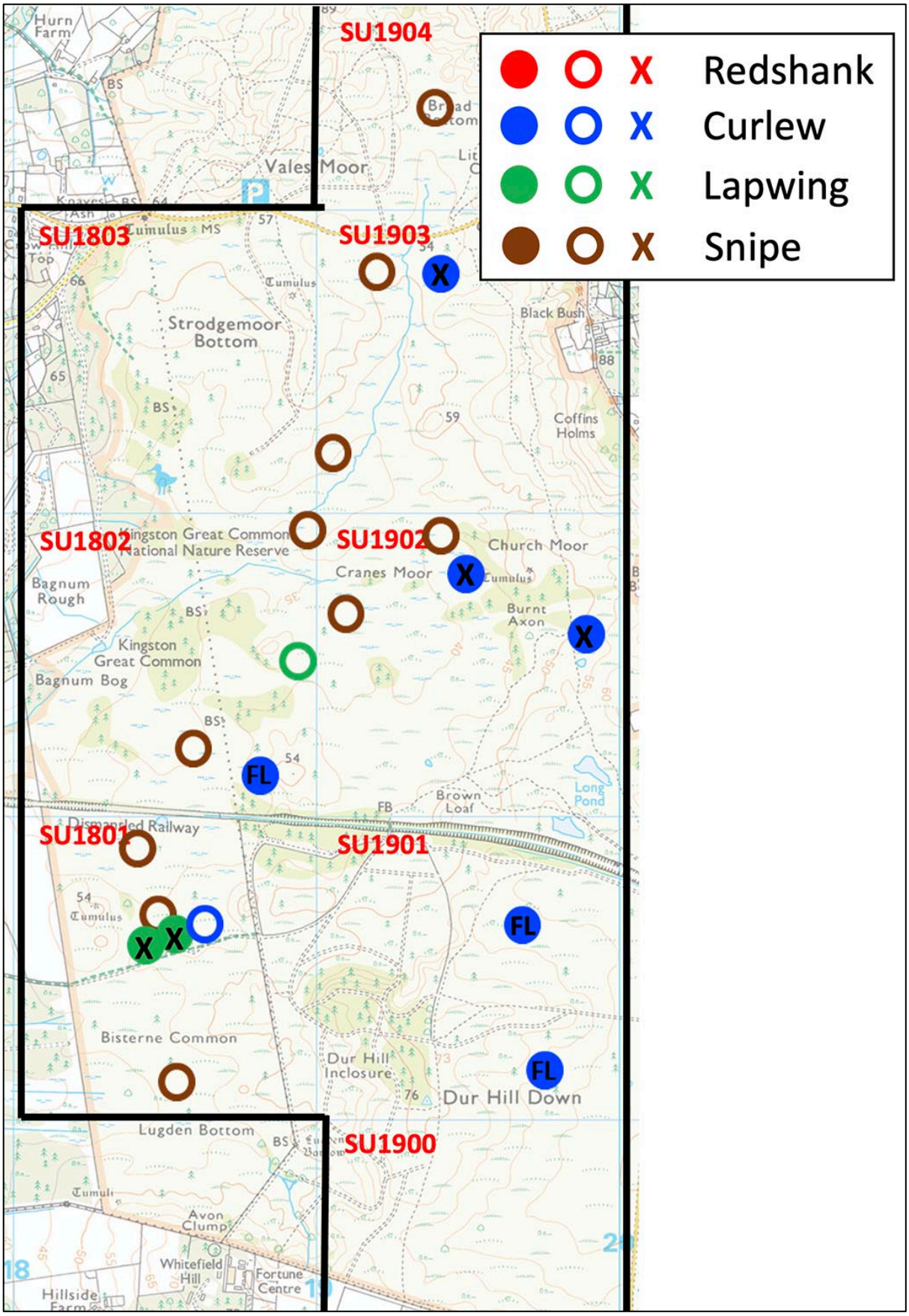

***Fig. 3.2.4**: Summary map showing wader (and other notable bird territories) in Area 4*

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	1	0	0	1
Carrion Crow	8	2	14	24
Buzzard	4	2	2	8
Other	Hen Harrier	0	0	1

***Table 3.2.4C**: Numbers of potential predators observed in Area 4*

The number of avian predators was relatively low with the majority of the Carrion Crows being recorded along the fringes of the site. Most of the Buzzard records relate to a breeding pair occupying a territory to the west of Strodgemoor.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	0	6 (4 dogs)	6 (3 dogs)	12 (7 dogs)
Walker	4	0	0	4
Runner	0	1	0	1
Cyclist	0	0	1	1
Horse-rider	0	0	0	0
Other	0	0	0	0

***Table 3.2.4D**: Numbers of recreational users observed in Area 4*

Numbers of recreational users were also low and no disturbance incidents were recorded - large parts of the area are inaccessible due to the extensive mires, and most recreational users were recorded close to the access point along Smugglers Road and along the track that runs north from Burbush to Castle Hill.

3.2.5. Area 5 (Backley and Bratley Plain)

Surveyor: Marcus Ward

One-kilometre squares: 6

Visit 1	Visit 2	Visit 3
16/04/20 (0630-0930)	03/05/20 (1815-2045)	29/05/20 (0530-0900)
16/04/20 (1815-2015)	06/05/20 (0600-0900)	31/05/20 (0530-0900)

***Table 3.2.5A**: Dates and times of each survey session during Visits 1-3 in Area 5*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	0	0	0	0
Lapwing	0	0	0	0
Snipe	7	4	13	13
Redshank	0	0	0	0

***Table 3.2.5B**: Numbers of breeding wader territories in Area 5*

The main features of Area 5 are the large southward-draining valley systems of Harvest Slade and Backley Bottom, and the adjacent plateau at Backley Holmes. The area is cut by the busy A31 dual carriageway and bordered to the south and east by a large tract of woodland.

***Fig. 3.2.5A**: Coverage of permanently wet bog habitats produced a few surprises, including this recently hatched Snipe chick at Blackensford Bottom on 31 May 2020*

Snipe was the only wader species recorded with a total of 13 territories mapped across the area - the main concentrations were along Backley Bottom (five territories) and the valley mires on Bratley Plain (four territories). Breeding was confirmed at Blackensford Bottom with two freshly hatched chicks being found close to an attending adult (Fig. 3.2.5A).

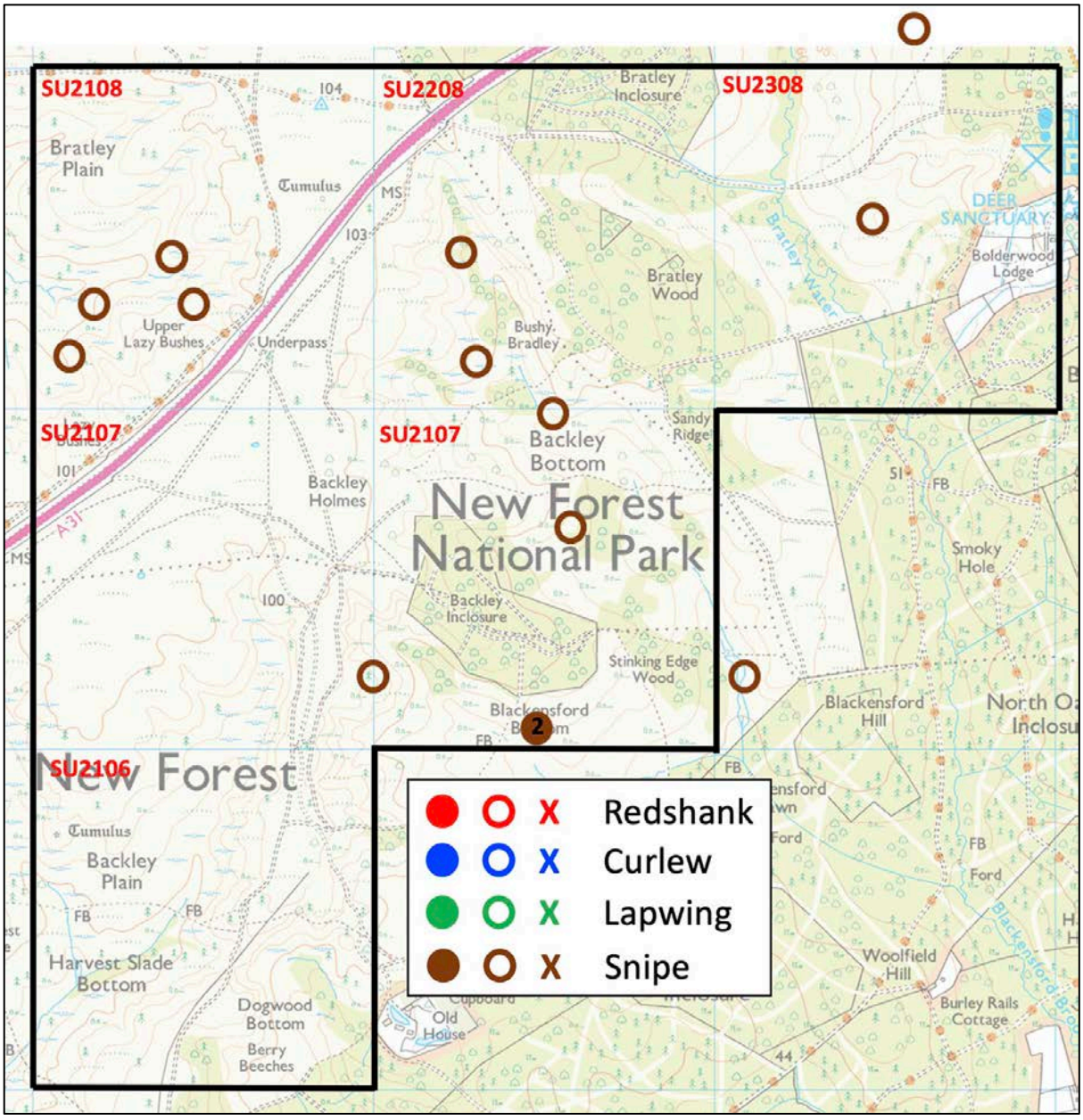

***Fig. 3.2.5B**: Summary map showing wader (and other notable bird territories) in Area 5*

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	0	0	0	0
Carrion Crow	2	2	2	6
Buzzard	0	3	2	5
Other	0	0	0	0

***Table 3.2.5C**: Numbers of potential predators observed in Area 5*

In common with other areas in the central New Forest, numbers of potential predators were low with few avian predators and no mammalian predators observed.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	0	0	0	0
Walker	0	0	0	0
Runner	0	0	0	0
Cyclist	0	0	0	0
Horse-rider	0	0	0	0
Other	Birdwatcher	0	0	1

***Table 3.2.5D**: Numbers of recreational users observed in Area 5*

Despite the relatively close proximity of the busy Bolderwood car park, few people venture beyond the cover of the nearby woodland. Just one other person, a birdwatcher, was seen over all of the visits made to the area.

3.2.6. Area 6 (Ocknell Plain and Milkham Bottom)

Surveyor: Russell Wynn

One-kilometre squares: 6

Visit 1	Visit 2	Visit 3
18/04/20 (1805-2005)	06/05/20 (1830-2030)	06/06/20 (0630-0900)
19/04/20 (1745-2000)	10/05/20 (0630-0930)	14/06/20 (1845-2045)
20/04/20 (1800-2000)	13/05/20 (0615-0915)	15/06/20 (1845-2115)
21/04/20 (0745-0915)		

***Table 3.2.6A**: Dates and times of each survey session during Visits 1-3 in Area 6*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	1	0	1	1
Lapwing	6	6	6	6
Snipe	6	6	6	6
Redshank	0	0	0	0

***Table 3.2.6B**: Numbers of breeding wader territories in Area 6*

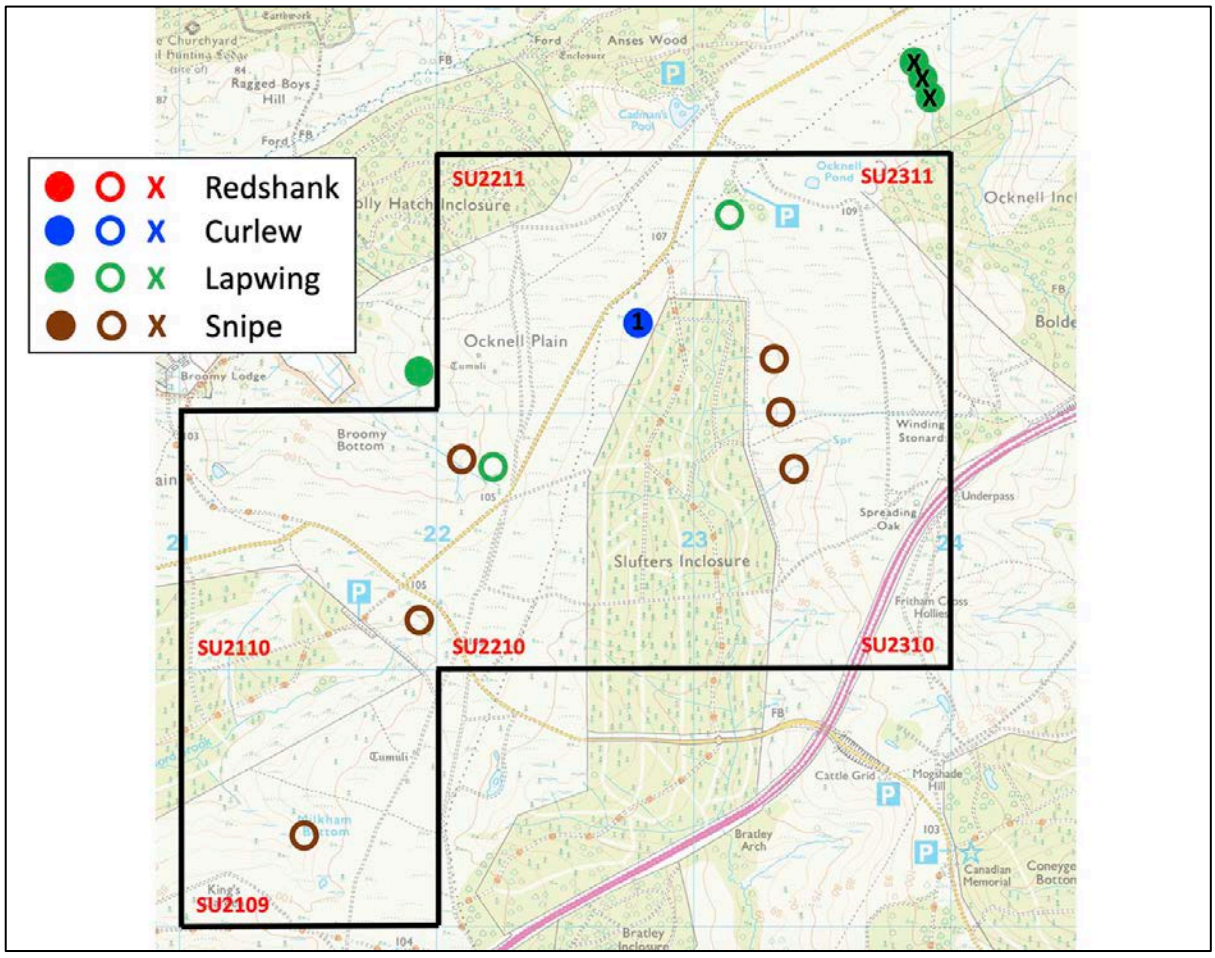

***Fig. 3.2.6A**: Summary map showing wader (and other notable bird territories) in Area 6*

Area 6 is centred on the flat expanse of Ocknell Plain and its adjacent valleys, including Milkham Bottom, Broomy Bottom, and a series of small valley mires along the eastern margin of Slufters Inclosure; it also includes the small valley northeast of Ocknell Pond that is just outside the defined survey area.

Breeding waders included a pair of Curlew that successfully raised a chick to fledging; this pair were first seen close to Ocknell Pond and the adjacent car park, but eventually nested close to the northwest margin of Slufters Inclosure - once the chicks were hatched they wandered as far south as the road junction near Milkham car park, over 1 km to the southwest, and were present until 31 July at least. Of interest, there were several reports of an additional bird accompanying this pair, including a sighting of all three together mobbing a Hobby on 24 June. A total of six Snipe territories were mapped, with at least three drumming birds seen together over the small valley mires east of Slufters Inclosure; a broken Snipe egg at Broomy Bottom on 18 May appeared to have been predated. Three pairs of Lapwing attempted breeding in the valley north of Ocknell Pond; at least five chicks were seen on Visit 2 but the site was deserted by Visit 3 and no chicks are believed to have fledged; another pair were seen aggressively defending chicks in Broomy Bottom (Fig. 3.2.6B), and a further two territories were occupied but breeding was not confirmed.

Fig. 3.2.6B*: Female Lapwing on territory at Broomy Bottom on 10 May 2020; this bird was metal-ringed and probably originated from a nearby site where several chicks have recently been ringed*

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	1	0	0	1
Raven	0	2	0	2
Carrion Crow	3	6	2	11
Buzzard	1	2	2	5
Other	0	0	1 Goshawk, 1 Red Kite	2

***Table 3.2.6C**: Numbers of potential predators observed in Area 6*

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	2 (3 dogs)	2 (3 dogs)	5 (4 dogs)	9 (10 dogs)
Walker	0	0	8	8
Runner	0	1	0	1
Cyclist	1	0	0	1
Horse-rider	0	0	0	0
Other	2	0	0	2

***Table 3.2.6D**: Numbers of recreational users observed in Area 6*

Tables 3.2.6C and 3.2.6D show the numbers of predators and recreational users observed in Area 6. Numbers of both were relatively low compared to other sites, with very few recreational users observed during Visits 1 and 2, during the lockdown period. The only observed disturbance incident was of a female dog-walker, with a dog off the lead and roaming widely, crossing the open ground south of Ocknell Pond on 21 Apr – this caused the three Lapwing present to take flight; when challenged she grudgingly put the dog on a lead, but proclaimed that as she had been walking there for 30 years she knew where all the nesting birds were!

3.2.7. Area 7 (Linwood Bog, Western Commons, Latchmore Brook and Dockens Water)

Surveyors: Marcus Ward and Russell Wynn

One-kilometre squares: 13

Visit 1	Visit 2	Visit 3
20/04/20 (0600-0900)	09/05/20 (1845-2045)	07/06/20 (0530-0900)
22/04/20 (1815-1945)	10/05/20 (0600-0900)	09/06/20 (0600-0830)
23/04/20 (0600-0900)	12/05/20 (0530-0900)	14/06/20 (0545-0845)

***Table 3.2.7A**: Dates and times of each survey session during Visits 1-3 in Area 7*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	3	3	1	4
Lapwing	1	1	1	2
Snipe	15	4	13	16
Redshank	0	0	0	0

***Table 3.2.7B**: Numbers of breeding wader territories in Area 7*

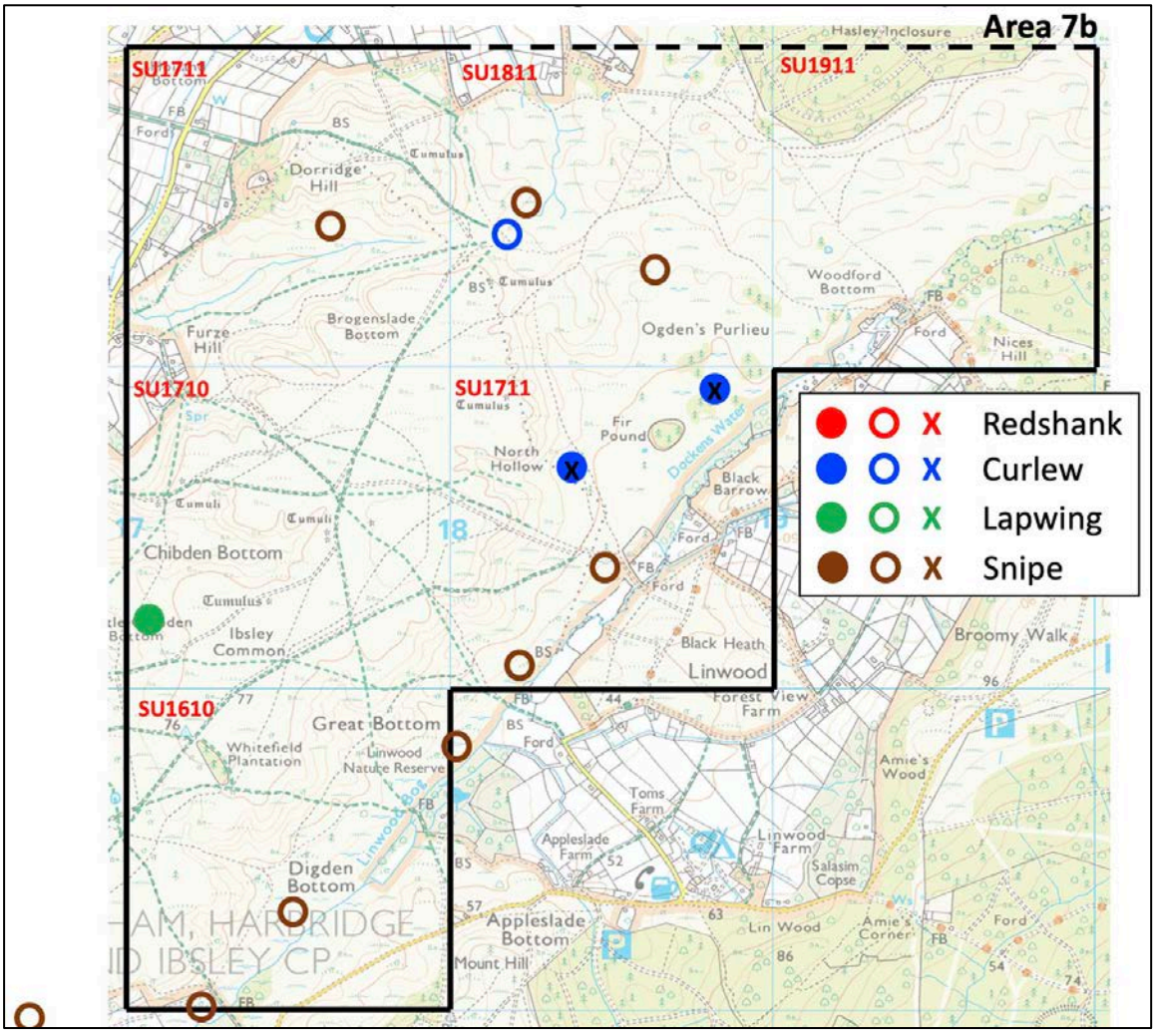

***Fig. 3.2.7A**: Summary map showing wader (and other notable bird territories) in Area 7a*

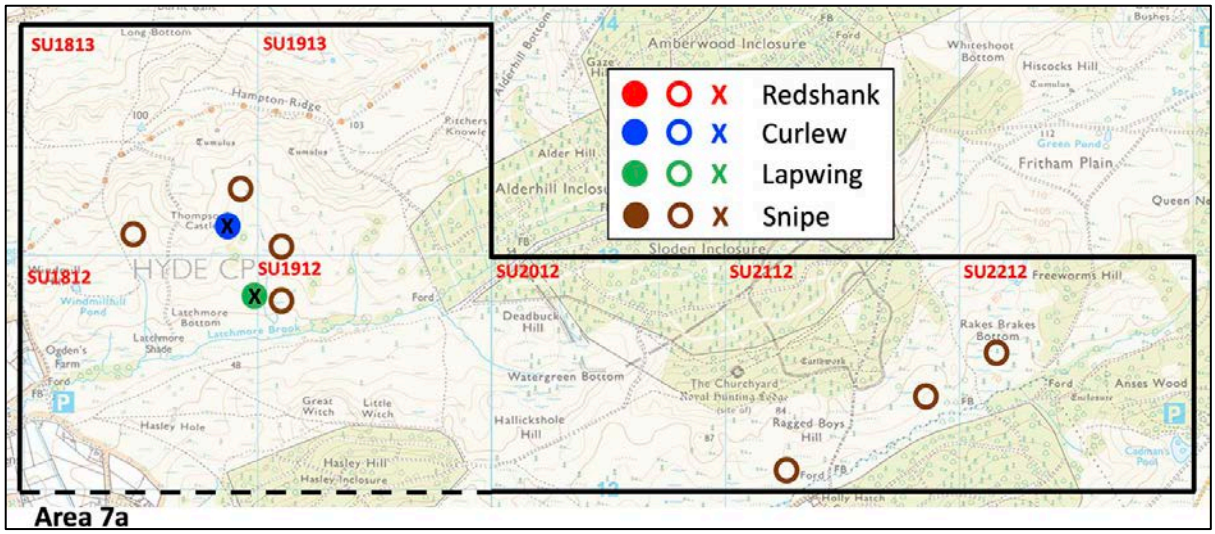

***Fig. 3.2.7B**: Summary map showing wader (and other notable bird territories) in Area 7b*

Area 7 has been divided in two for mapping purposes as it is a relatively large area; the southern section is dominated by Dockens Water, the extensive low-lying mire system of Ogdens Purlieu (Fig. 3.2.7C), and the adjacent plateau of Ibsley Common, while the northern section comprises a series of small mires that feed into Dockens Water and Latchmore Brook.

***Fig. 3.2.7C**: Photo looking across Fir Pound showing an area of prime Curlew habitat, with damp grassland in the valley floor bordered by extensive heathland*

Four pairs of Curlew were mapped across Area 7 - three failed at the egg stage, while the Latchmore pair hatched but the chicks were predated. Of interest, one was reported coming into roost at Windmillhill Pond on 26 June, presumably from this pair. A total of 16 Snipe territories was recorded, with two significant concentrations: along the Dockens Water at

Linwood Bog (six territories) and the seepage mire on the south side of Hampton Ridge (four territories). Interestingly, none were recorded in similar habitat on the shadier northern side of Hampton Ridge over the three visits. Two pairs of Lapwing were mapped, with a pair at Latchmore Brook observed sitting on Visit 1 but absent during Visit 2, and Chibden Bottom where recently hatched young were seen during Visit 3.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	1	0	1	2
Raven	3	0	1	4
Carrion Crow	30	20	9	59
Buzzard	5	1	0	6
Other	1 Goshawk	0	0	1

***Table 3.2.7C**: Numbers of potential predators observed in Area 7*

Relatively high numbers of avian predators were recorded in Area 7, with Curlews seen mobbing Carrion Crows and Ravens on a number of occasions. Foxes were noted twice at dusk in the vicinity of Rakes Brakes Bottom.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	4 (4 dogs)	11 (8 dogs)	17 (13 dogs)	32 (25 dogs)
Walker	2	3	7	12
Runner	0	0	0	0
Cyclist	3	3	3	9
Horse-rider	0	3 (1 loose dog)	0	3 (1 dog)
Other	2 motorised scooters	0	2 motorised paragliders	4

***Table 3.2.7D**: Numbers of recreational users observed in Area 7*

Numbers of recreational users were unexceptional, however, disturbance events included: two low-flying motorised paragliders passing southeast over Hasley Hill on the evening of 15 June that led to a pair of Curlews flushing and circling for several minutes, and general panic amongst livestock and other birds (reported to FE), local teenagers racing each other on motorised scooters on the evening of 22 Apr (reported to FE) and a horse rider with a spaniel that was running freely off the lead at Fir Pound causing considerable disturbance to nesting Curlew.

3.2.8. Area 8 (Ashley Hole, Black Gutter Bottom and Deadman Bottom)

Surveyor: Russell Wynn

One-kilometre squares: 8

Visit 1	Visit 2	Visit 3
19/04/20 (0640-0940)	06/05/20 (0620-0900)	13/06/20 (0615-0930)
22/04/20 (0630-0930)	07/05/20 (0615-0915)	14/06/20 (0615-0915)
25/04/20 (0630-1000)	09/05/20 (0615-0930)	15/06/20 (0620-0930)

***Table 3.2.8A**: Dates and times of each survey session during Visits 1-3 in Area 8*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	3	4	3	4
Lapwing	0	1	0	1
Snipe	7	10	9	12
Redshank	0	0	0	0

***Table 3.2.8B**: Numbers of breeding wader territories in Area 8*

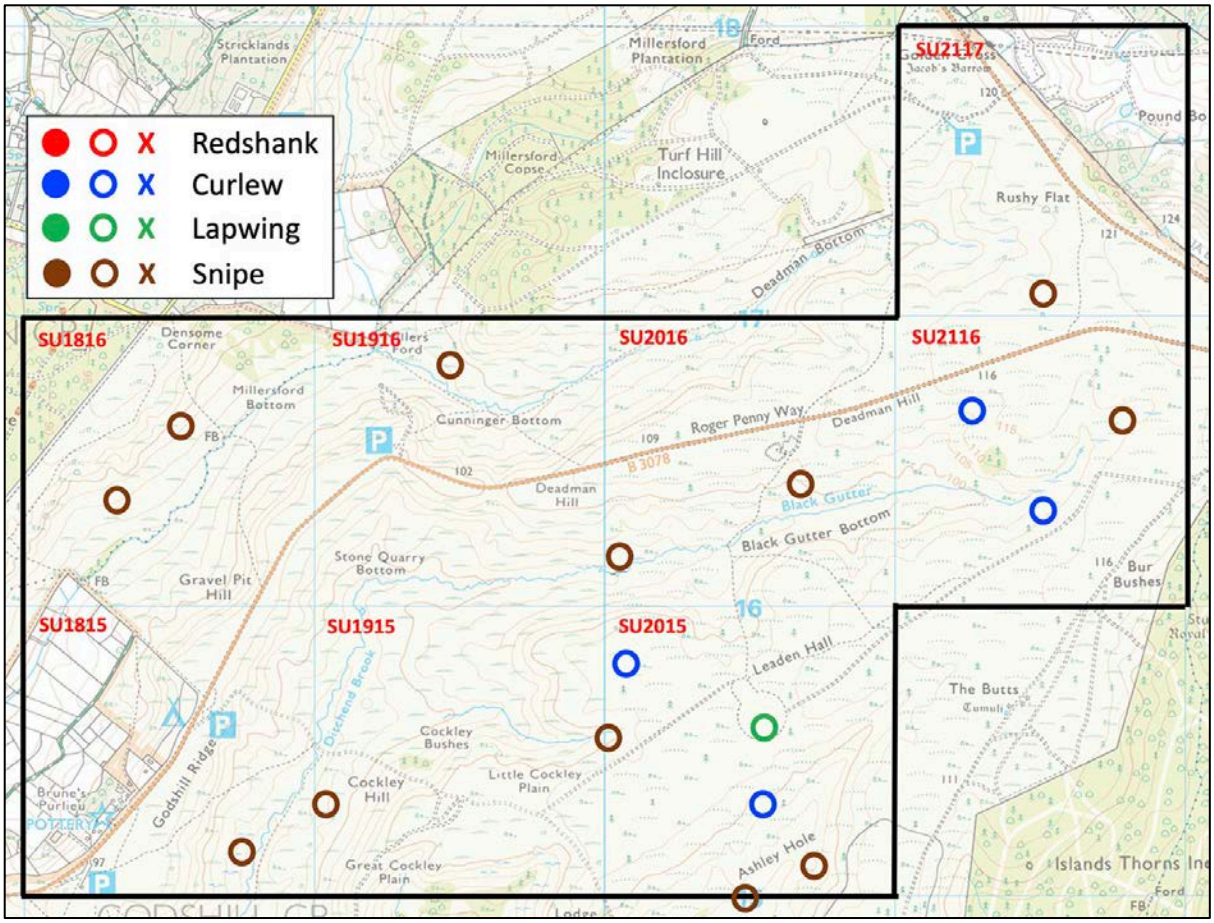

***Fig. 3.2.8A**: Summary map showing wader (and other notable bird territories) in Area 8*

Area 8 is dominated by the three large NE-SW trending valley systems of Deadman Bottom, Black Gutter Bottom and Ashley Hole, and also includes the intervening ridges and plateaus of Deadman Hill, Leaden Hall and Cockley Plain. The elevated relief means that valleys in this area are more deeply incised than those in the south of the New Forest (Fig. 3.2.8B), and boggy habitats are relatively scarce, small in area, and mostly confined to flatter sections of valley axes and the heads of seepage mires on valley margins (Fig. 3.2.8C).

***Fig. 3.2.8B**: This image of an incised stream near Stone Quarry Bottom is typical of the northern valleys; habitat for breeding Snipe in these areas is limited, but the tightly grazed lawns adjacent to the stream provide abundant opportunities for feeding Curlews*

***Fig. 3.2.8C**: Seepage mires at the heads and margins of several major valleys in Area 8, where permanently wet ground and livestock grazing helps to maintain suitable conditions for a small number of Snipe territories*

At least four Curlew territories were mapped in Area 8, but there is low confidence in their location and breeding status due to the complexities of surveying this large expanse of open heathland and grassland. At least one pair were seen feeding in Stone Quarry Bottom during Visit 3 (Fig. 3.2.8B) but it is not clear which (if any) of the mapped territories they relate to; there were also several observations of birds moving between this area and Longcross Plain / Howen Bottom (Area 9). No nests were located, no chicks were observed, and at least one of the territories was apparently occupied by an unmated male. The 12 Snipe territories were well scattered, with most suitable areas of boggy habitat holding at least one or two territories. The only Lapwing territory was on Leaden Hall.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	2	0	1	3
Carrion Crow	26	19	29	74
Buzzard	2	4	1	7
Other	1 Goshawk	0	2 Peregrines	3

***Table 3.2.8C**: Numbers of potential predators observed in Area 8*

A total of 20-30 Carrion Crows were recorded on all three visits (Table 3.2.8C) and two pairs of Ravens nested adjacent to the area - on a pylon at Golden Cross and in tall conifers in Pitts Wood Inclosure. A pair of Peregrines were observed co-operatively hunting a Racing Pigeon on 13 June.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	13 (13 dogs)	6 (8 dogs)	19 (23 dogs)	38 (44 dogs)
Walker	0	7	0	7
Runner	0	1	6	7
Cyclist	0	2	0	2
Horse-rider	0	0	2	2
Other	0	0	0	0

***Table 3.2.8D**: Numbers of recreational users observed in Area 8*

This area is relatively popular with dog-walkers, accounting for two-thirds of all recreational users (Table 3.2.8D).

3.2.9. Area 9 (Longcross Plain, Howen Bottom and Claypits Bottom)

Surveyor: Russell Wynn

One-kilometre squares: 5

Visit 1	Visit 2	Visit 3
16/04/20 (0630-0930)	08/05/20 (1840-2030)	05/06/20 (1910-2040)

***Table 3.2.9A**: Dates and times of each survey session during Visits 1-3 in Area 9*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	1	1	2	2
Lapwing	1	1	1	1
Snipe	0	0	0	0
Redshank	0	0	0	0

***Table 3.2.9B**: Numbers of breeding wader territories in Area 9*

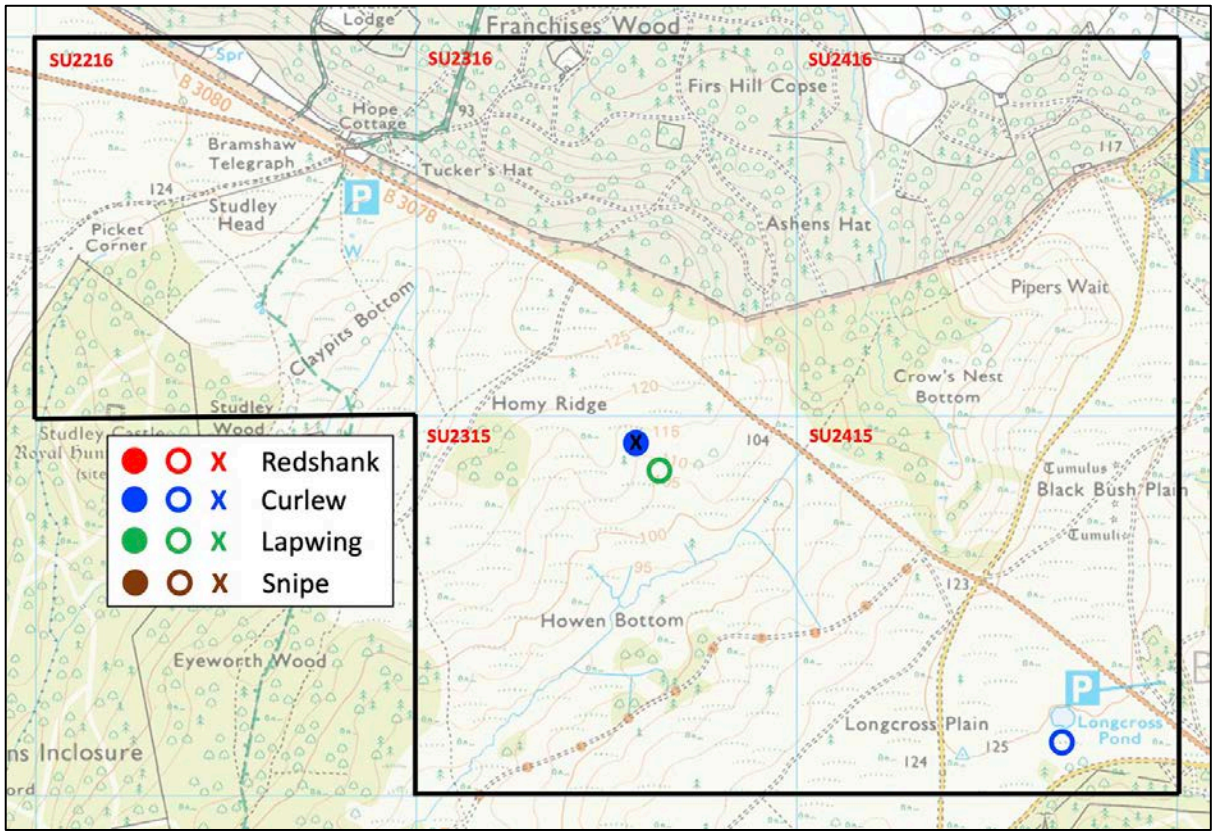

***Fig. 3.2.9**: Summary map showing wader (and other notable bird territories) in Area 9*

Area 9 comprises an extensive plateau of heavily grazed heathland on Longcross and Black Bush Plain, as well as two NE-SW trending valleys at Howen Bottom and Claypits Bottom, and an intervening ridge at Homy Ridge. Suitable habitat for breeding waders is relatively sparse, with the north-western side-valley of Howen Bottom the most consistently used site.

A pair of Curlews (including a returning colour-ringed bird that has been present since at least 2016) bred in the side valley extending northwest from Howen Bottom, but the chicks were apparently predated soon after 09 June. One or two Curlews were also observed on multiple dates in the vicinity of Longcross Pond, but there was no evidence of breeding; as well as being a feeding area for the Howen Bottom birds, a pair of unringed birds were seen there during Visit 3 at a time when the Howen Bottom birds were defending chicks. A pair of Lapwing attempted breeding in the Howen Bottom side valley, but no chicks were seen. A lack of suitable wetland habitat, especially during the dry conditions of April-May 2020, meant that no other wader territories were recorded in this area. A juvenile Lapwing accompanying an adult pair at Longcross Pond on Visit 3 was presumed to have fledged from another area.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	1	1	1	3
Carrion Crow	10	5	7	22
Buzzard	0	0	0	0
Other	0	0	0	0

***Table 3.2.9C**: Numbers of potential predators observed in Area 9*

Of note, a Raven was mobbed by Curlews over the Howen Bottom nest site on 16 Apr before departing west, and a non-breeding immature bird was regularly seen around Longcross Pond in May and June (and appeared to be roosting in tall conifers ~300m south of the pond).

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	1 (1 dog)	0	7 (6 dogs)	8 (7 dogs)
Walker	2	2	0	4
Runner	0	0	0	0
Cyclist	0	0	0	0
Horse-rider	0	0	0	0
Other	0	0	0	0

***Table 3.2.9D**: Numbers of recreational users observed in Area 9*

On 08 June a dog-walker with three dogs off the lead was seen walking through the valley where Curlews had chicks.

3.2.10. Area 10 (Beaulieu Heath West)

Surveyor: Marcus Ward

One-kilometre squares: 9

Visit 1	Visit 2	Visit 3
10/04/20 (0620-0920)	26/04/20 (0600-0900)	18/05/20 (0530-0830)
10/04/20 (1800-2000)	26/04/20 (1830-2030)	18/05/20 (1900-2100)
11/04/20 (0620-0920)	27/04/20 (0600-0900)	19/05/20 (1900-2100)
	03/05/20 (1415-1615)	15/06/20 (0545-0915)
	14/05/20 (1900-2030)	

***Table 3.2.10A**: Dates and times of each survey session during Visits 1-3 in Area 10*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	3	3	4	4
Lapwing	2	4	5	5
Snipe	6	8	10	12
Redshank	1	1	1	1

***Table 3.2.10B**: Numbers of breeding wader territories in Area 10*

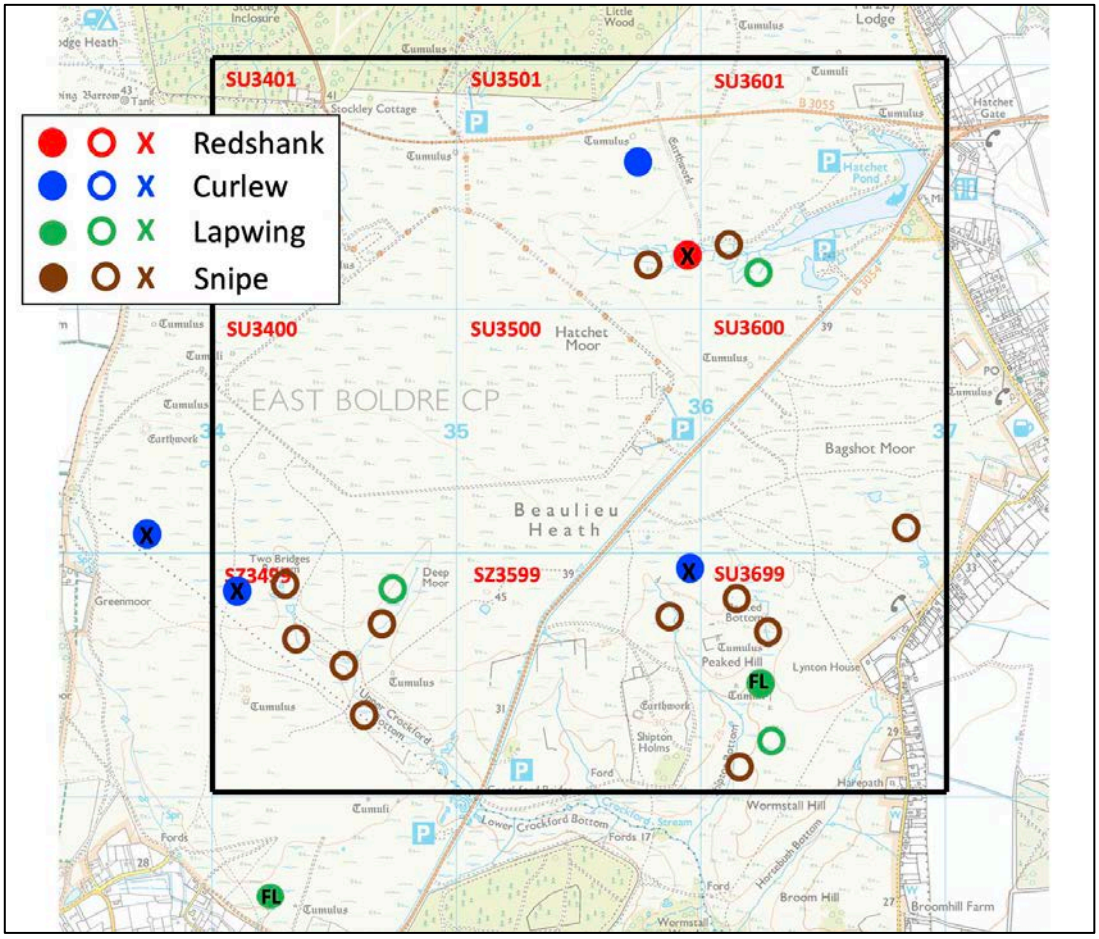

***Fig. 3.2.10A**: Summary map showing wader (and other notable bird territories) in Area 10*

Area 10 is focussed on Beaulieu Heath - West, and mostly comprises flat-lying dry heath. Extensive valley mires in the soutt of the area feed into the Crockford Stream, while Hatchet Pond lies in the northeast of the area; the feeder stream at the west of the pond holds all four species of breeding wader. The area is crossed by the B3054 and B3055 roads.

Four pairs of Curlew made six nesting attempts within area 10. After failing early, two pairs attempted a second brood (Peaked Hill and Deep Moor), both of which also failed at the egg stage. Just one pair hatched chicks at Hatchet Moor, although these were lost within a week. One pair of Redshank attempted to nest in the Hatchet Pond feeder stream, however these failed after Visit 3, possibly as a result of the increased disturbance after the easing of lockdown. Twelve Snipe territories were mapped, all centred on the main valley mires with concentrations in Crockford and Shipton Bottom. Five pairs of Lapwing attempted to breed with two successfully hatching young at Shipton Bottom and Bull Hill. Also of note, a pair of Oystercatchers that showed some territorial behaviour at Hatchet Pond but didn't progress to breeding.

The number of avian predators was relatively high across all visits, with corvids concentrating on the lawn by Lynton House associating with the large numbers of stock and latterly around Hatchet Pond. Marsh Harriers were seen visiting from a nest site at Lymington Reedbeds; during an extra afternoon visit one was observed carrying chick prey back to the nest on four occasions over a period of four hours. It was also noted that large numbers of Pheasants were recorded across the area on all visits, most likely escapes from the nearby estates.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	1	1
Raven	0	0	0	0
Carrion Crow	32	29	19	80
Buzzard	4	0	1	5
Other	0	Marsh Harrier	Marsh Harrier	2

***Table 3.2.10C**: Numbers of potential predators observed in Area 10*

Recreation use was focussed in the southwest and east of the area, mostly comprising local dog-walkers originating from the hamlets of East Boldre, East End and Pilley Bailey. It was noted that very few 'ground-nesting bird' warning signs were placed in the area – when challenged, a couple of local dog-walkers with unruly dogs argued that the lack of signage meant their impact was less significant in this area!

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	20 (20 dogs)	9 (8 dogs)	11 (13 dogs)	40 (41 dogs)
Walker	0	1	47	48
Runner	0	4	1	5
Cyclist	2	0	1	3
Horse-rider	0	0	0	0
Other	0	0	0	0

***Table 3.2.10D**: Numbers of recreational users observed in Area 10*

Hatchet Pond also attracted large numbers of visitors, many of whom go on to walk the circuit of the pond – this leads to people regularly cutting across the feeder stream at the western end of the pond to complete the circuit, in an area where Redshank, Snipe and Lapwing attempted breeding (Fig. 3.2.10B). No warning signage was evident in the Hatchet Pond area. Many walkers/dog-walkers were approached and happily the majority were unaware of their potential impact on breeding waders and were happy to co-operate.

***Fig. 3.2.10B**: Photo showing recreational users at Hatchet Pond on cutting across the western feeder stream in an area containing several breeding wader territories (see Fig. 3.2.10A)*

3.2.11. Area 11 (Beaulieu Heath – East)

Surveyor: Russell Wynn

One-kilometre squares: 5

Visit 1	Visit 2	Visit 3
10/04/20 (0630-0930)	26/04/20 (0610-0910)	08/06/20 (0615-0905)
11/04/20 (0630-0900)	27/04/20 (0610-0910)	10/06/20 (0630-0900)

***Table 3.2.11A**: Dates and times of each survey session during Visits 1-3 in Area 11*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	4	5	5	5
Lapwing	11	11	4	12
Snipe	5	7	2	7
Redshank	4	6	0	6

***Table 3.2.11B**: Numbers of breeding wader territories in Area 11*

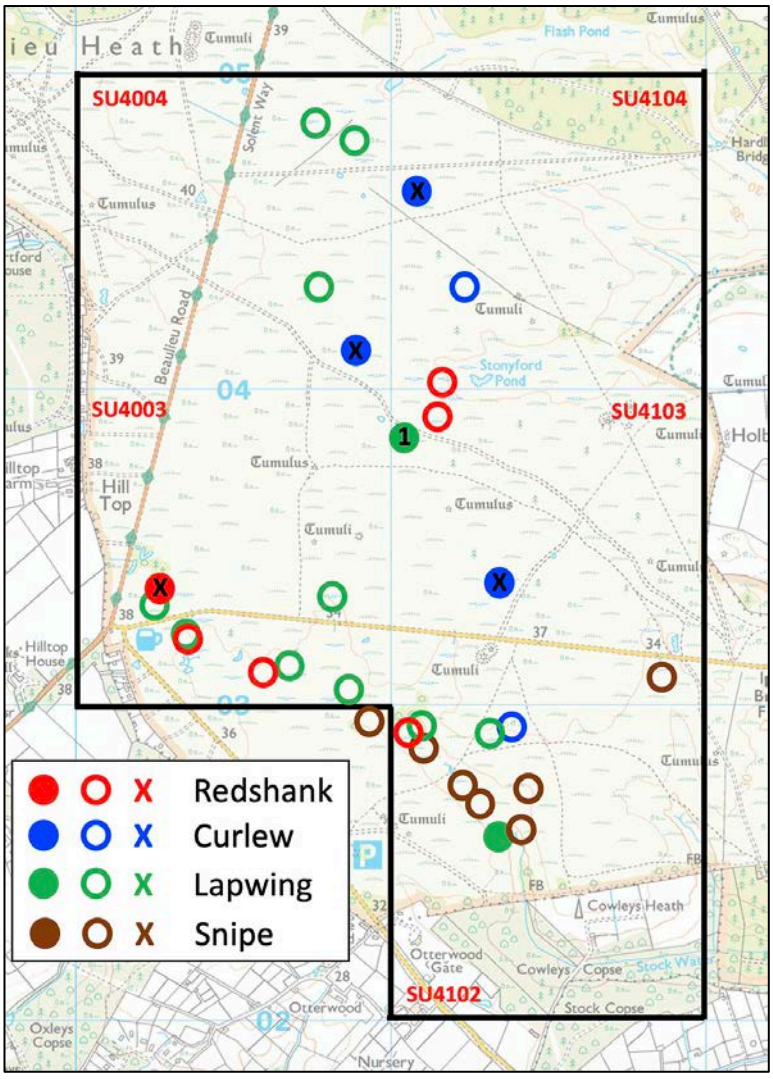

***Fig. 3.2.11A**: Summary map showing wader (and other notable bird territories) in Area 11*

Area 11 is centred on the extensive flat plain of Beaulieu Heath - East, which mostly comprises damp heathland and grassland with extensive gorse patches. The heath is drained by two shallow valley mire systems at Moonhills and Stonyford Pond, with a couple of additional smaller valleys draining northeast and southeast.

A quick look at the map in Fig. 3.2.11 highlights the importance of this area for breeding waders, particularly the valley system at Moonhills; A total of 30 breeding wader territories were recorded in Area 11 - the highest of any survey area. However, the drought in April-May led to rapid drying of boggy areas and disappearance of standing water in Moonhills valley (Fig. 3.2.11B), and most breeding waders therefore abandoned the site. The proximity to the adjacent coast (~5 km) also produced several observations of waders leaving the site and heading high south, suggesting regular interchange between these two habitats.

At least five Curlew territories were mapped in Area 11, with three pairs producing chicks based on direct observations and behaviour of the adult birds, but all appear to have been predated. There is low confidence in the location and status of the remaining two territories, which probably relate to unmated males. A total of 12 Lapwing territories were mapped, with the highest concentration in and around the Moonhills valley, however, only four territories were still occupied on Visit 3, with one fledged juvenile near Stonyford Pond and two pairs apparently defending chicks in Moonhills valley. Seven Snipe territories were concentrated in Moonhills valley, but only two remained by Visit 3. It was a similar story for Redshank, with up to six vocal pairs present in Moonhills valley and near Stonyford Pond on Visits 1 and 2, but none remaining by Visit 3 representing total breeding failure in this area.

It is notable that this area appears to be an important site for wintering Snipe, with at least ten birds flushed or chipping north of the Hill Top to Ipers bridge road during Visit 1 that were not recorded subsequently. Three Jack Snipe were also flushed during Visit 1.

Tables 3.2.11C and 3.2.11D below highlight some of the severe pressures that are impacting ground-nesting birds in this area, and that are likely contributing to the observed low productivity. The area is a particular hotspot for corvids, with two pairs of Ravens breeding adjacent to the area (one on pylons to the east and one in conifers to the west) and at least two non-breeding immatures recorded; fledged juveniles from both nests were recorded on Visit 3, at which time at least nine Ravens were roaming across the site. Around 20-30 Carrion Crows were also seen on each visit, with the highest concentration associated with cattle along the Hill Top to Dibden Purlieu road. At least two pairs of Peregrines nest within ~5 km of the area, and were seen hunting, while a Short-eared Owl seen during Visit 1 may have been a lingering wintering bird.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	3	3	9	15
Carrion Crow	22	28	18	68
Buzzard	2	1	3	6
Other	1 Short-eared Owl	1 Peregrine	2 Peregrines	4

***Table 3.2.11C**: Numbers of potential predators observed in Area 11*

There were numerous observations of interactions between these aerial predators and breeding waders, particularly Lapwing and Curlew attacking overflying Ravens and Carrion Crows. On 10 June, all seven Curlews remaining in the area were seen in the air together attempting to see off a family party of Ravens. Predated Snipe remains were found near Stonyford Pond during Visit 1 (probably a wintering bird), and a predated adult Redshank was found at the head of Moonhills valley during Visit 3, where a pair were recorded as nesting on the previous visit.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	3 (3 dogs)	14 (22 dogs)	10 (11 dogs)	27 (36 dogs)
Walker	5	5	1	11
Runner	1	1	2	4
Cyclist	0	0	0	0
Horse-rider	0	3	2	5
Other	0	0	0	0

***Table 3.2.11D**: Numbers of recreational users observed in Area 11*

The area also experienced significant recreational disturbance, particularly during Visit 2 in April when access restrictions were still in force. For example, a dog-walker was seen with six dogs off the lead and roaming widely across Lapwing and Curlew territories near Moonhills valley, and two runners with a dog were seen away from marked paths and close to known Curlew and Lapwing nests northwest of Stonyford Pond. The lay-by near Ipers Bridge Farm appeared to be a particular dog-walking hotspot and focus for disturbance, despite the presence of signage, e.g. a noisy dog-walker with four dogs off the lead and roaming widely was seen adjacent to the valley west of this car park, where Snipe were attempting to breed.

To summarise, the 30 wader territories in Area 11 experienced near total breeding failure in 2020, primarily due to predation and drought, but probably exacerbated by recreational disturbance.

***Fig. 3.2.11B**: View along Moonhills valley on 08 June 2020, showing the parched and poached valley floor that just two months earlier had been a thriving wetland*

3.2.12. Area 12 (Dibden Bottom and Yew Tree Heath – East)

Surveyor: Russell Wynn

One-kilometre squares: 6

Visit 1	Visit 2	Visit 3
12/04/20 (0625-0925)	29/04/20 (0600-0900)	30/05/20 (0640-0940)
14/04/20 (0625-0925)	01/05/20 (0600-0900)	04/06/20 (0615-0845)
		09/06/20 (0615-0915)

***Table 3.2.12A**: Dates and times of each survey session during Visits 1-3 in Area 12*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	3	4	4	4
Lapwing	2	3	3	3
Snipe	9	10	4	10
Redshank	0	0	0	0

***Table 3.2.12B**: Numbers of breeding wader territories in Area 12*

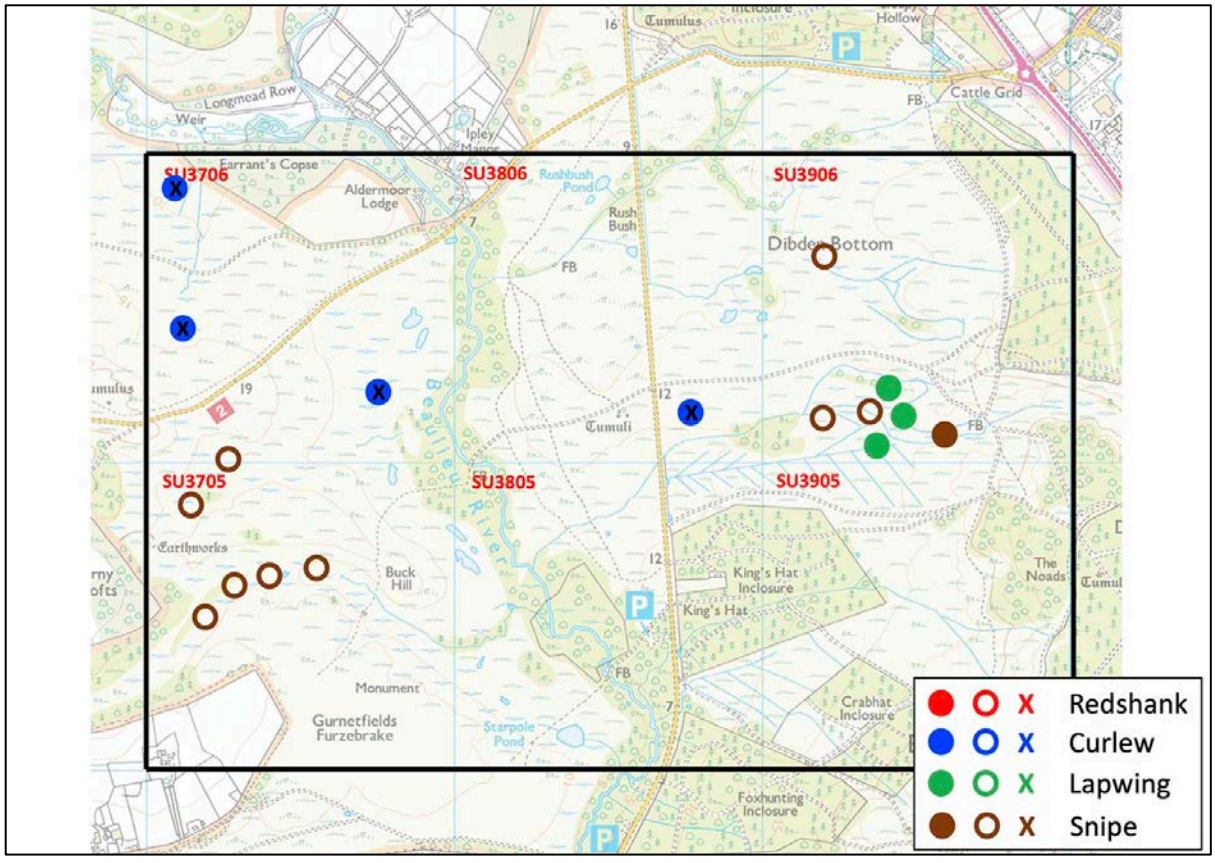

***Fig. 3.2.12A**: Summary map showing wader (and other notable bird territories) in Area 12*

Area 12 includes a mostly wooded section of the Beaulieu River and a series of shallow valley mires and drainage ditches that feed in from the east across Dibden Bottom (Fig. 3.2.12B) and from the west across the southeast margin of Yew Tree Heath.

***Fig. 3.2.12B**: Panoramic image showing high-quality breeding wader habitat at Dibden Bottom – the presence of standing water with poached muddy margins and adjacent damp grassland provides ideal conditions for Snipe and Lapwing*

Four Curlew territories were identified: a pair east of the Beaulieu River that appeared to be defending chicks, and three west of the river that are all presumed to have failed at the egg stage; the latter birds were occasionally seen heading north to feed around the southern margin of Ipley Inclosure. The only site holding breeding Lapwing was the southeast corner of Dibden Bottom, where three pairs appeared to be defending chicks during Visit 3; at least four birds that were apparently occupying territories to the southeast of Ipley Bridge early in the season on 18 Mar had gone by Visit 1 on 14 Apr. The total of 10 Snipe territories included concentrations in the mire systems west of Ferny Crofts and at Dibden Bottom (Fig. 3.2.12B), although some of these sites dried out and may have been abandoned as only four territories were recorded as occupied during Visit 3. A nest with four eggs was located at Dibden Bottom on 09 June, in boggy ground on the edge of a drainage ditch and only ~150m from a heavily used path.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	3	3	6	12
Carrion Crow	12	21	21	53
Buzzard	7	1	3	11
Other	0	0	0	0

***Table 3.2.12C**: Numbers of potential predators observed in Area 12*

A range of avian predators was observed, including a pair of Ravens that successfully raised four young at Applemore, a few hundred metres outside the area (a pair of non-breeders were also seen). The Lapwing colony at Dibden Bottom was seen collectively defending against Ravens on 12 Apr.

The eastern edge of this area appears to be heavily utilised by recreational users, particularly the footbridge crossing the mire beyond the northwest edge of Dibden Inclosure. A female runner was seen with two dogs off the lead ranging widely in the mire by this footbridge on 09 June, close to the location where the Snipe nest was found; when approached she claimed to have no awareness of why this might be an issue. Unofficial roadside parking areas near Applemore gate (SU395072) and at Ipley Bridge (SU379067) appeared to be the source for many of the dog-walkers and walkers using this area.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	8 (10 dogs)	10 (10 dogs)	12 (15 dogs)	30 (35 dogs)
Walker	4	5	4	13
Runner	2	0	4	6
Cyclist	5	1	4	10
Horse-rider	0	0	0	0
Other	0	0	0	0

***Table 3.2.12D**: Numbers of recreational users observed in Area 12*

3.2.13. Area 13 (Black Down, Bishops Dyke and Yew Tree Heath – West)

Surveyor: Russell Wynn

One-kilometre squares: 7

Visit 1	Visit 2	Visit 3
10/04/20 (1800-2000)	26/04/20 (1815-2015)	25/05/20 (0615-0845)
11/04/20 (1800-2000)	27/04/20 (1810-1910)	26/05/20 (1830-2100)
12/04/20 (1800-2000)	29/04/20 (1810-2020)	28/05/20 (0620-0920)
13/04/20 (1800-2000)	01/05/20 (0600-1000)	30/05/20 (0640-0940)
14/04/20 (1750-1950)	01/05/20 (1810-2010)	31/05/20 (0615-0945)
15/04/20 (0630-0930)	02/05/20 (1820-2020)	02/06/20 (0610-0810)

***Table 3.2.13A**: Dates and times of each survey session during Visits 1-3 in Area 13*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	5	5	7	7
Lapwing	3	4	6	5
Snipe	7	6	8	11
Redshank	0	1	0	0

***Table 3.2.13B**: Numbers of breeding wader territories in Area 13*

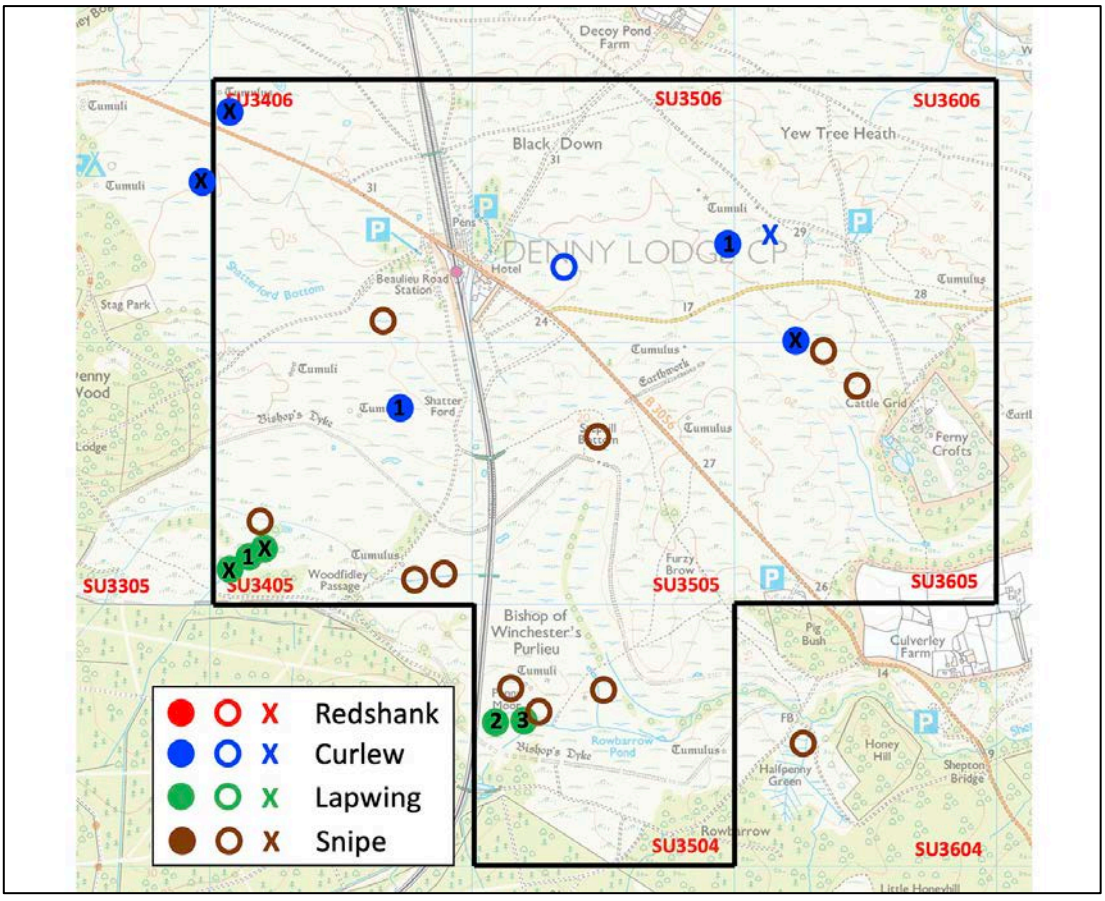

***Fig. 3.2.13**: Summary map showing wader (and other notable bird territories) in Area 13*

Area 13 comprises a variety of wetland habitats, including abundant damp heathland and grassland incised by shallow valleys, and an extensive series of bogs and valley mires. It is cut by the Southampton-Bournemouth railway line and the B3056, both of which converge at Beaulieu Road Station where there are two official car parks.

This area holds the highest density of breeding Curlews in the New Forest, with seven territories located in 2020. Five of these were confirmed as nesting, with one apparently non-breeding pair and also a single unmated bird that was loosely associated with the nesting pair west of Yew Tree Heath car park. At least three pairs reached the chick stage, but the brood of four at Black Down (north of the B3056) disappeared soon after hatching. Adults with chicks were still present west of Yew Tree Heath car park and in the Shatterford Bottom area in the second half of July, with two chicks seen to fledge at the latter site on 29 July. It was notable that the pair that nested south of Shatterford car park were seen feeding within 200 m of the car park itself during Visit 1, and again when the chicks fledged in late July – the car park was closed at the time due to general access restrictions, and remained closed until the end of July due to the presence of this pair and other ground-nesting birds. Curlews from the western Black Down and Shatterford Bottom territories were also regularly observed feeding along the roadside verges to the northwest of Beaulieu Road Station.

Lapwing nested at Penny Moor and on the pool west of Woodfidley Passage, with all five pairs producing chicks; however, at the latter site only one chick made it to fledging. The 11 Snipe territories were well scattered, with some within-season movement of territories detected, presumably due to some sites drying out. For example, at least two or three birds were frantically drumming and chipping in the mire east of Woodfidley Passage during Visit 3, where they had been absent during Visits 1 and 2. A pair of Redshank were seen on the pool west of Woodfidley Passage during Visit 2 on 27 Apr, but they did not stay to breed.This area appears to be important for wintering Snipe, e.g. 22 were recorded during Visit 1 including 15 that were flushed, several in small groups.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	5	4	2	11
Carrion Crow	18	14	19	51
Buzzard	8	4	0	12
Other	0	1 Goshawk	2 Goshawks, 1 Peregrine	4

***Table 3.2.13C**: Numbers of potential predators observed in Area 13*

A variety of avian predators were observed in Area 13. Of note was a pair of Ravens that nested just outside the area in Frame Heath Inclosure, and an additional pair of non-breeding immature birds that held a territory near Beaulieu Road Station; the Curlews at Shatterford

Bottom and near Yew Tree Heath car park were seen defending chicks against this pair in July. Adult male Goshawks were seen during Visits 2 and 3. An immature Peregrine over Black Down on 31 May was presumably the reason why the pair of Curlews with four young chicks there were both in the air alarming for several minutes, but is unlikely to have been the ultimate cause of the chicks' predation.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	2 (3 dogs)	7 (4 dogs)	14 (13 dogs)	23 (20 dogs)
Walker	4	15	6	25
Runner	1	1	0	2
Cyclist	12	4	4	20
Horse-rider	0	0	0	0
Other	0	0	0	0

***Table 3.2.13D**: Numbers of recreational users observed in Area 13*

This area held a greater variety of recreational users than most other sites, with nearly equal numbers of dog-walkers, walkers and cyclists recorded; this may be linked to its location close to the tourist/population hubs at Lyndhurst, Brockenhurst and Beaulieu (and associated cycle hire facilities). The car park at Yew Tree Heath is now routinely closed during the ground-nesting bird breeding season, but Shatterford car park also remained closed this spring after access restrictions were lifted due to the presence of nesting Curlews this year (and other ground-nesting birds such as Woodlark and Nightjar). The car parks at Beaulieu Road Station and Pig Bush were therefore the source of most dog-walkers and walkers, with the latter in particular facilitating access to sensitive wetland sites around Rowbarrow and Penny Moor. The Lapwings at Woodfidley Passage were reported on 01 May to be disturbed by two people with three dogs (one off the lead) wandering off the path.

3.2.14. Area 14 (Matley Holms, Longdown and Pottern Ford)

Surveyor: Russell Wynn

One-kilometre squares: 3

Visit 1	Visit 2	Visit 3
15/04/20 (0630-0930)	02/05/20 (0600-1000)	26/05/20 (0600-0900)
	03/05/20 (1800-1930)	31/05/20 (0615-0945)

***Table 3.2.14A**: Dates and times of each survey session during Visits 1-3 in Area 14*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	2	1	3	3
Lapwing	2	4	5	5
Snipe	0	2	0	2
Redshank	0	0	0	0

***Table 3.2.14B**: Numbers of breeding wader territories in Area 14*

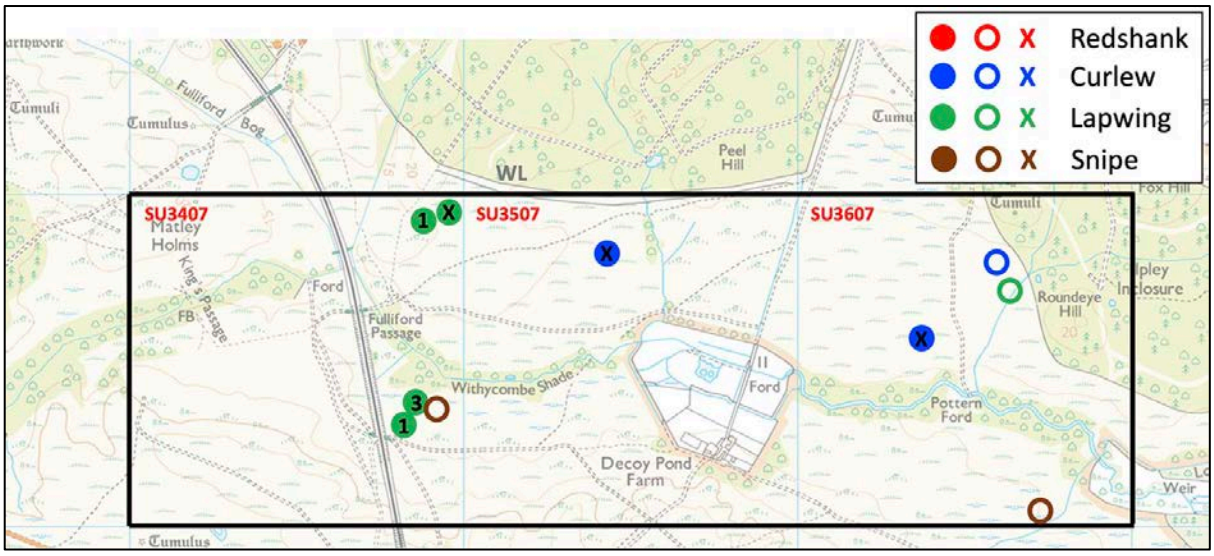

***Fig. 3.2.14**: Summary map showing wader (and other notable bird territories) in Area 14*

Area 14 is focussed on an extensive area of damp grassland and heathland either side of the Beaulieu River, in the vicinity of Decoy Pond Farm. It also includes scattered boggy areas such as those found northeast and southeast of Fulliford Passage.

Three pairs of Curlews nested in the area, none of which made it to the egg stage. A colour-ringed bird observed feeding adjacent to the western margin of Ipley Inclosure had nested to the southwest of Pottern Ford. Four pairs of Lapwing nested in the boggy areas adjacent to Fulliford Passage, and another territory was identified near to Ipley Inclosure. During Visit 3, three of the pairs adjacent to Fulliford Passage had at least eight chicks and one was still apparently nesting. There was only one Snipe territory occupied.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	2	0	0	2
Carrion Crow	11	8	14	33
Buzzard	0	1	1	2
Other	0	0	0	0

***Table 3.2.14C**: Numbers of potential predators observed in Area 14*

Numbers of avian predators in this area appeared to be about average. The Curlew pair northwest of Pottern Ford, and the Lapwing near the margin of Ipley Inclosure, were both seen aggressively defending their nest against Carrion Crows during Visit 3.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	2 (1 dog)	5 (3 dogs)	15 (14 dogs)	22 (18 dogs)
Walker	2	0	6	8
Runner	0	0	6	6
Cyclist	0	1	3	4
Horse-rider	2	0	2	4
Other	0	3 in off-road vehicle	0	3

***Table 3.2.14D**: Numbers of recreational users observed in Area 14*

There was a mix of recreational users observed, with most apparently originating from Longdown and Deerleap car parks, or the Matley area to the east. Three commoners were seen crossing the open heath in an off-road vehicle south of Longdown Inclosure on the evening of 03 May, in an area where Curlew and Woodlark territories were present. The incident was reported to Forestry England and other relevant bodies and was followed up accordingly.

3.2.15. Area 15 (Longwater Lawn and White Moor)

Surveyor: Russell Wynn

One-kilometre squares: 5

Visit 1	Visit 2	Visit 3
16/04/20 (1730-2000)	04/05/20 (0615-0945)	21/05/20 (1800-2100)
17/04/20 (0600-0730)	04/05/20 (1900-2030)	
17/04/20 (1815-1945)		

***Table 3.2.15A**: Dates and times of each survey session during Visits 1-3 in Area 15*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	2	1	1	1
Lapwing	3	3	3	3
Snipe	2	1	1	1
Redshank	0	0	0	0

***Table 3.2.15B**: Numbers of breeding wader territories in Area 15*

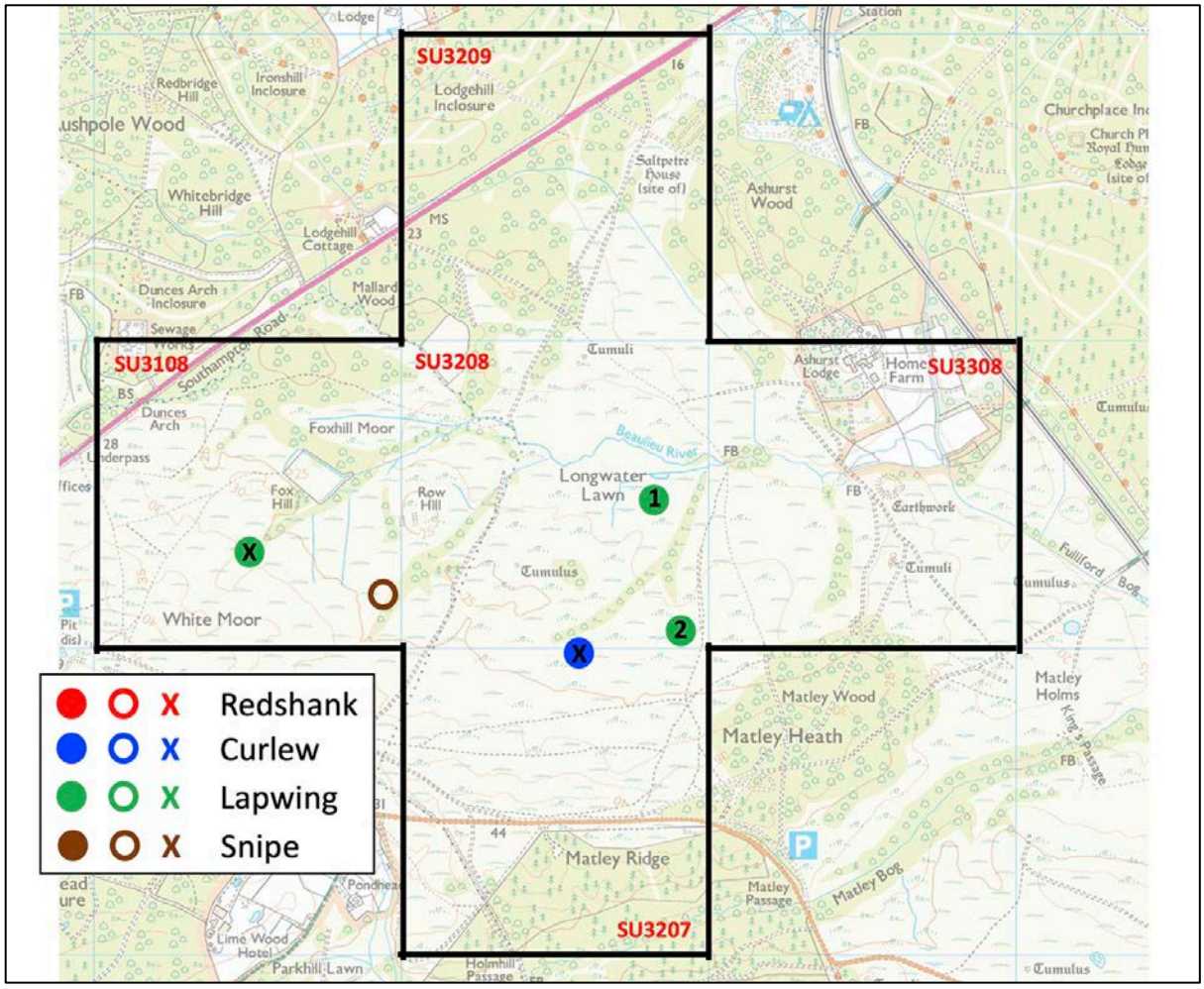

***Fig. 3.2.15A**: Summary map showing wader (and other notable bird territories) in Area 15*

Area 15 is focussed on the upper reaches of the Beaulieu River, and includes Longwater Lawn and a series of bogs and small valley mires. There are also extensive areas of damp heathland and grassland, particularly at White Moor and Matley Heath.

Only one pair of Curlews bred in this area, although an additional displaying bird was present in early spring in the White Moor area. The breeding Curlews were initially seen displaying and copulating south of Ashurst Lodge / Home Farm, but settled to the south of Longwater Lawn. They failed at the egg or early chick stage – the location of the nest close to a Buzzard nest, and the persistent calling by the off-duty male, probably meant that any chicks that did emerge were doomed!

Three pairs of Lapwing were recorded as breeding, but there were probably twice as many breeding attempts. At White Moor two territories were recorded early in the season but only one pair (unsuccessfully) attempted breeding. Chicks were later seen nearby at Fox Hill, that probably related to an additional breeding attempt. Two pairs raised chicks in the Longwater Lawn area, one of these possibly having moved from an initial territory south of Ashurst Lodge / Home Farm. A single Snipe territory was at White Moor.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	1	1	2
Raven	0	0	0	0
Carrion Crow	49	38	31	118
Buzzard	2	0	2	4
Other	0	0	0	0

***Table 3.2.15C**: Numbers of potential predators observed in Area 15*

In addition to the two Foxes, the most notable potential predators in this area were the large numbers of Carrion Crows, mostly involving birds flocking in the eastern part of the area due to the presence of big herds of livestock. Supplementary feeding of cattle near the northern margin of Matley Wood consistently drew in >50 Carrion Crows over the winter, and these lingered throughout the spring, with a roving flock of 45 in April and around 20 still present in May and June (additional to breeding birds). The lack of any breeding waders in the bog south of Home Farm may be due to persistently high numbers of corvids in this area, as both Lapwing and Curlew were seen to establish territories there early in the spring but moved elsewhere to nest. It was notable that the two pairs of Lapwing nesting in the Longwater Lawn area were observed spending large amounts of time defending their nests and chicks against Carrion Crows. A similar concentration of corvids was observed nearby during the winter and early spring, associated with another supplementary feeding area for cattle at Sandholes to the north of Fulliford Passage. This issue has been reported to Natural England and other relevant authorities, and a request made to move the supplementary feeding areas away from sensitive wetland sites holding breeding waders and a range of specialist invertebrates.

During additional visits to the Area 15 in May, nesting Lapwings were seen defending against a ringed immature Peregrine that had a non-breeding territory in the area, and the off-duty Curlew was seen mobbing a Buzzard taking prey back to its nearby nest. The Lapwings at White Moor were also observed mobbing a pale-phase Buzzard prior to the survey period on 17 Mar.

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	7 (6 dogs)	6 (4 dogs)	10 (9 dogs)	23 (19 dogs)
Walker	7	1	17	25
Runner	0	1	0	1
Cyclist	5	2	7	14
Horse-rider	0	0	0	0
Other	0	0	0	0

***Table 3.2.15D**: Numbers of recreational users observed in Area 15*

The proximity to Lyndhurst means this area is popular with visiting walkers and cyclists (Fig. 3.2.15B), as well as local dog-walkers. Locations such as White Moor and Longwater Lawn were observed to be subject to heavy visitor pressure, both during the core visits and supplementary visits, with several observations of groups of dogs off the lead and ranging widely across heathland and wetland habitats.

***Fig. 3.2.15B:** This cyclist on an e-bike was seen on several mornings riding across Longwater Lawn and the adjacent heath, despite being challenged and photographed more than once!*

3.2.16. Area 16 (Withybed Bottom and Lucas Castle)

Surveyor: Russell Wynn

One-kilometre squares: 2

Visit 1	Visit 2	Visit 3
23/04/20 (0730-0930)	07/05/20 (1830-2030)	24/05/20 (0610-0910)

***Table 3.2.16A**: Dates and times of each survey session during Visits 1-3 in Area 16*

Species	Visit 1	Visit 2	Visit 3	Final number
Curlew	0	0	0	0
Lapwing	0	0	0	0
Snipe	4	3	4	4
Redshank	0	0	0	0

***Table 3.2.16B**: Numbers of breeding wader territories in Area 16*

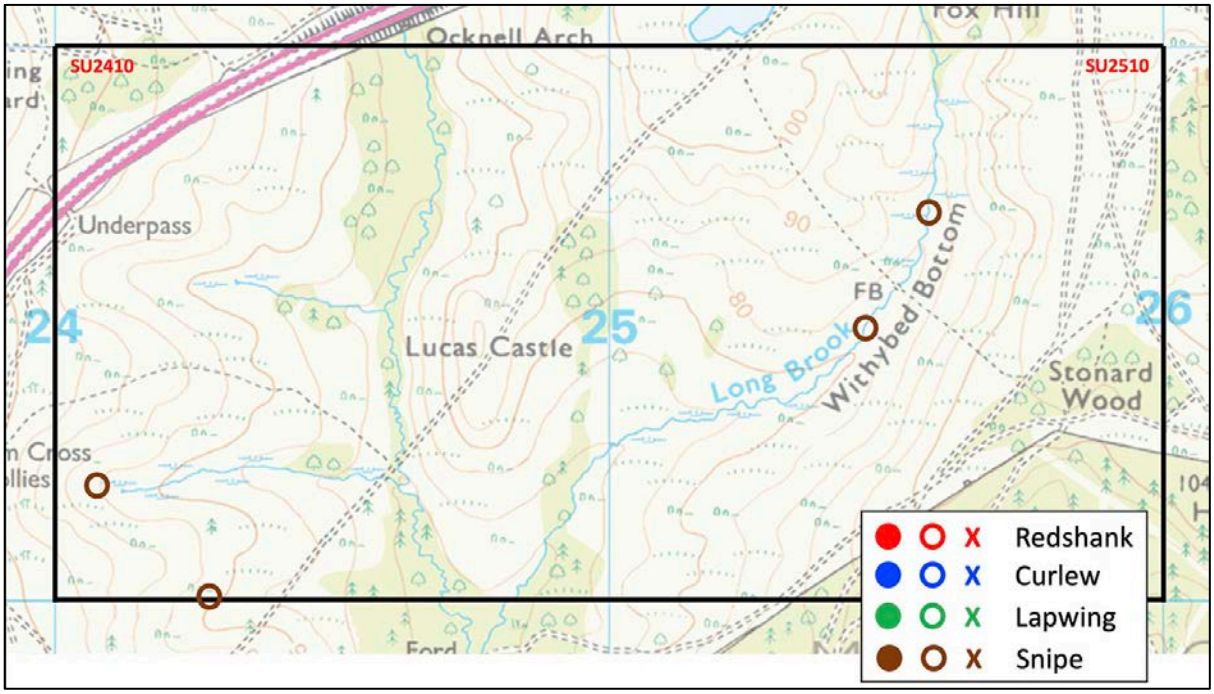

***Fig. 3.2.16A**: Summary map showing wader (and other notable bird territories) in Area 16*

Area 16 comprises the broad valley of Withybed Bottom (Fig. 3.2.16A and B) and a series of smaller valleys that drain off the ridge at Fritham Cross that is now crossed by the A31 (which is a significant source of noise pollution). Suitable habitat for breeding waders is largely restricted to the wetter sections of these valleys, and some of the seepage mires on the flanks of Withybed Bottom.

The only breeding waders in this area were Snipe, with four territories consistently identified. Prior to the A31 being installed, the valley mires west of Lucas Castle that hold at least two territories would have been part of a larger complex of Snipe territories draining off the

adjacent ridge, with a further three territories identified in Area 6 on the west side of this ridge. The permanently wet sections of Withybed Bottom, mostly in the upper and central sections, also held at least two Snipe territories, and a Jack Snipe was flushed there during Visit 1.

Species	Visit 1	Visit 2	Visit 3	Aggregate
Fox	0	0	0	0
Raven	0	0	0	0
Carrion Crow	2	3	3	8
Buzzard	1	0	1	2
Other	0	0	0	0

***Table 3.2.16C**: Numbers of potential predators observed in Area 16*

Although this is only a small area, the low number of potential predators (Table 3.2.16C) is similar to the adjacent Area 6 centred on Ocknell Plain, and points towards genuinely reduced density of avian predators in this central part of the New Forest, possible due to the distance from the nearest village and associated infrastructure. Similar to the situation with potential predators, the low number of recreational users observed is at least partly due to the distance from population centres (Table 3.2.16D).

Activity	Visit 1	Visit 2	Visit 3	Aggregate
Dog-walker	0	2 (2 dogs)	3 (2 dogs)	5 (4 dogs)
Walker	0	2	0	2
Runner	0	0	0	0
Cyclist	0	0	0	0
Horse-rider	0	0	0	0
Other	0	0	0	0

***Table 3.2.16D**: Numbers of recreational users observed in Area 16*

3.2.17. Other areas

A small number of additional wader territories were identified by the survey team and from submitted data. Although these additional records are not included in the summary totals provided in Section 3.3, they are provided here for completeness.

On the Crown Lands, two pairs of Lapwing nested on seepage mires south of Broadley Inclosure. An additional pair was seen on several dates on the northern part of Butts Lawn but it is not thought that breeding was attempted. Further afield, but still within the National Park, at least one pair of Lapwing were noted on farmland to the east of Foxbury Plantation (SU3017) on 16 Mar with one again seen on 03 Apr, so it seems likely that breeding was attempted. Snipe were recorded chipping from the valley mire east of Bratley Arch on 25 Mar.

A common theme emerging from repeat visits to many of the survey areas was the important role that livestock, particularly cattle, play in shaping habitats for breeding waders in the New Forest SPA; in this image cattle are seen grazing and poaching an area containing breeding Snipe in Black Gutter Bottom, opening up the vegetation and providing a valuable food source via their dung

3.3. Summary maps, totals and pertinent observations for each wader species

3.3.1. Curlew

A total of 48 Curlew territories were recorded (Table 3.3.1), which is consistent with totals recorded in the period 2016-19, suggesting a stable population over the five-year period. However, this is set against a two-thirds decline over the last two decades, and continued low productivity means that future decline appears inevitable. Increased survey effort during July, co-ordinated by AP and PhD student Elli Rivers, led to confirmed fledging of two chicks at Shatterford Bottom, and possible fledging of chicks from the nests at Ocknell Plain, Yew Tree Heath and Five Thorns Hill. Overall, predation of eggs and chicks means that productivity is likely to be far lower than the ~0.5 chicks per pair per year that is required to maintain a stable population, although further studies into the actual success rates of Curlew are still required.

Area	Visit 1	Visit 2	Visit 3	**Total**
1	1	1	2	**2**
2	2	2	2	**2**
3	1	3	3	**3**
4	5	5	4	**6**
5	0	0	0	**0**
6	1	0	1	**1**
7	3	3	1	**4**
8	3	4	3	**4**
9	1	1	2	**2**
10	3	3	4	**4**
11	4	5	5	**5**
12	3	4	4	**4**
13	5	5	7	**7**
14	2	1	3	**3**
15	2	1	1	**1**
16	0	0	0	**0**
Total	**36**	**38**	**42**	**48**

Table 3.3.1: Number of Curlew territories seen in each area during each visit, and final total

The majority of territories contained nesting pairs, but a small number of un-mated birds (mostly displaying males) were also seen. In a couple of areas (e.g. Ocknell Plain and near Yew Tree Heath car park), un-mated birds appeared to be closely associating with a particular breeding pair and may have been previous years' fledglings returning to their natal area. It was also interesting to note that in two areas (Beaulieu Heath East and Yew Tree Heath / Black Down), groups of seven birds, each comprising six breeding pairs and an un-mated bird, co-operatively mobbed overflying Ravens until they left the area. This semi-colonial behaviour may be a response to the recently increased threat from Ravens (see Section 4.3).

The first returning Curlew seen on (or near) a potential territory was one at Woodlands on 25 Feb, which appears to be a regular feeding area for birds breeding between Lyndhurst and Beaulieu. However, most began to return from mid-March onwards. Curlews with chicks that survived to fledging were still present on breeding sites until 31 July at least. Curlews were therefore present on breeding sites from March to July inclusive.

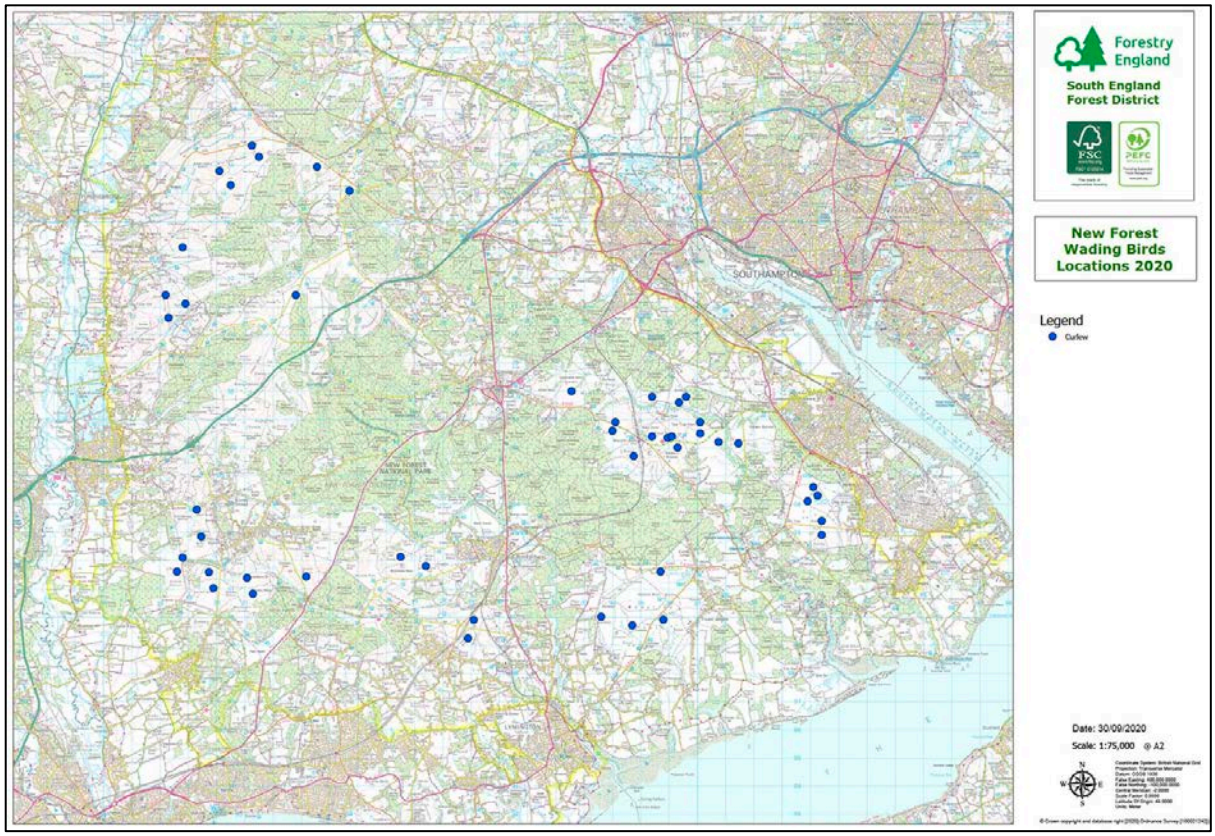

Fig. 3.3.1A: Map showing locations of all Curlew territories in the New Forest in spring 2020 (map produced by Forestry England)

Curlews are still widely distributed across the New Forest (Fig. 3.3.1A) and prefer to nest in extensive open areas of damp heath and grassland, away from the wettest boggy habitats and the drier heather-dominated areas (Fig. 3.3.1B). Sward length of <30 cm is preferred, and nests are often located on elevated tussocks surrounded by cross-leaved heath and purple moor-grass, so that birds sitting on the nest can still see approaching predators. Nests are sometimes located <200 m from riverine or inclosure woodland (Fig. 3.3.1A and 3.3.1B) but are usually found in more open areas. Curlews regularly use meadows/pastures and coastal sites outwith the New Forest SPA for feeding throughout the breeding cycle, as originally noted by Tubbs and Tubbs (1994).

Fig. 3.3.1B: Curlew nests with two eggs at Pottern Ford on 02 May (left, clutch in the process of being laid) and with four eggs at Longdown on 26 May (right).

Further discussion pertinent to future management action for this species can be found in Section 4.

3.3.2. Lapwing

The total of 61 Lapwing territories (Table 3.3.2) is consistent with the total recorded during the HLS survey in 2019 and marks a dramatic decline in recent years. This decline has, in part, been driven by high adult mortality associated with severe winter weather in early 2018. However, it seems likely that breeding Lapwings are also suffering from high predation levels as with Curlew, although fledging success appears to be markedly higher than in that species (probably as a result of Lapwing having the capability to make multiple nesting attempts in a season).

Area	Visit 1	Visit 2	Visit 3	**Total**
1	5	1	3	**5**
2	1	2	1	**2**
3	7	5	3	**8**
4	0	2	1	**3**
5	0	0	0	**0**
6	6	6	6	**6**
7	1	1	1	**2**
8	0	1	0	**1**
9	1	1	1	**1**
10	2	4	5	**5**
11	11	11	4	**12**
12	2	3	3	**3**
13	3	4	6	**5**
14	2	4	5	**5**
15	3	3	3	**3**
16	0	0	0	**0**
Total	**44**	**48**	**42**	**61**

Table 3.3.2: Number of Lapwing territories seen in each area during each visit, and final total

Lapwing were seen defending territories from early March onwards and nearly fledged juveniles were still present on breeding sites in mid-July. Most territories were located in the south and east of the New Forest, with only ten territories located north of the A31 and eight in the western sector around Burley (Fig. 3.3.2). Nests were located in a wide range of habitats, typically on relatively flat-lying and open sites with a short sward, including areas of recently burnt heath, damp heath, grassland, and drier parts of bogs and shallow valley mires; as noted by Tubbs and Tubbs (1994), they usually nest close to wetter and more impenetrable areas that can be used as a refuge for chicks. It was notable in several areas that some of the breeding pairs that successfully raised chicks were located close to busy paths, suggesting recreational disturbance is perhaps less of an issue for this species than for Curlew and

Redshank. Maintenance of open habitats through burning and grazing, and numbers of generalist predators, are probably key controls on the population of this species.

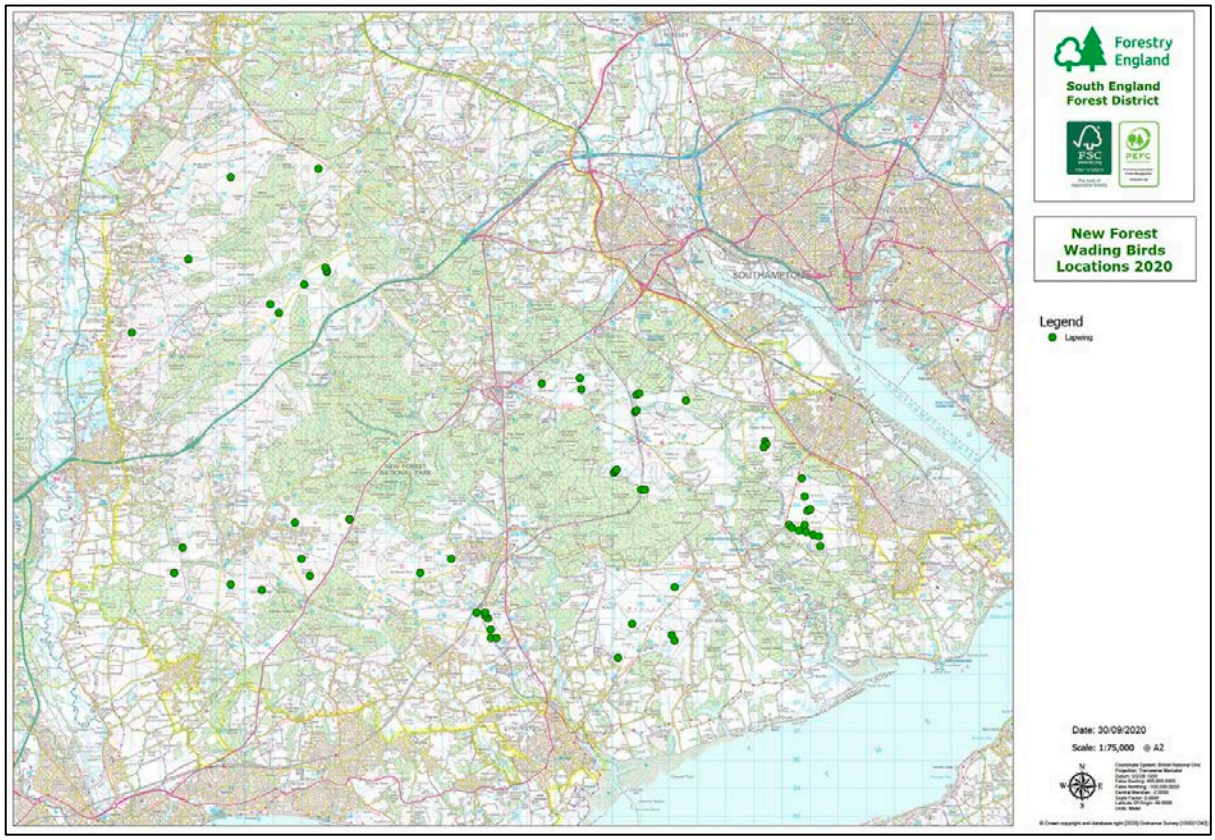

Fig. 3.3.2: Map showing locations of all Lapwing territories in the New Forest in spring 2020 (map produced by Forestry England)

3.3.3. Snipe

A total of 151 Snipe territories was recorded (Table 3.3.3); this is significantly higher than the last HLS survey total in 2014 (102 territories), but similar to the forest-wide population estimate in 1994, indicating a stable population over the last two or three decades. It is likely that predation issues are reduced for this species due to their preference for wetter habitats and well-concealed nest sites (Fig. 3.3.3A).

Area	Visit 1	Visit 2	Visit 3	**Total**
1	7	10	4	**11**
2	6	17	18	**21**
3	15	11	13	**15**
4	5	3	5	**10**
5	7	4	13	**13**
6	6	6	6	**6**
7	15	4	13	**16**
8	7	10	9	**12**
9	0	0	0	**0**
10	6	8	10	**12**
11	5	7	2	**7**
12	9	10	4	**10**
13	7	6	8	**11**
14	0	2	0	**2**
15	2	1	1	**1**
16	4	3	4	**4**
Total	**101**	**102**	**110**	**151**

Table 3.3.3: Number of Snipe territories seen in each area during each visit, and final total

Snipe were recorded chipping from mid-March, but the large number of birds flushed in Visit 1 of the survey and not recorded subsequently suggests wintering and/or passage birds were still present in April. The presence of Jack Snipe at several sites in April should also be noted, as this species can be hard to separate from Snipe by inexperienced observers. For this survey, territories related to vocalising and/or displaying birds only, and only vocalising birds >100 m apart were deemed to be separate territories (as females can also vocalise).

As Snipe was the most abundant breeding wader (with territories located in all but one of the surveyed areas) the species provided a useful opportunity to better understand habitat requirements and the influence of different management and grazing regimes. Snipe were widely distributed in a variety of permanently wet habitats across the New Forest (Fig. 3.3.3A), including extensive bogs, valley mires and relatively small seepage mires (often close to the spring line).

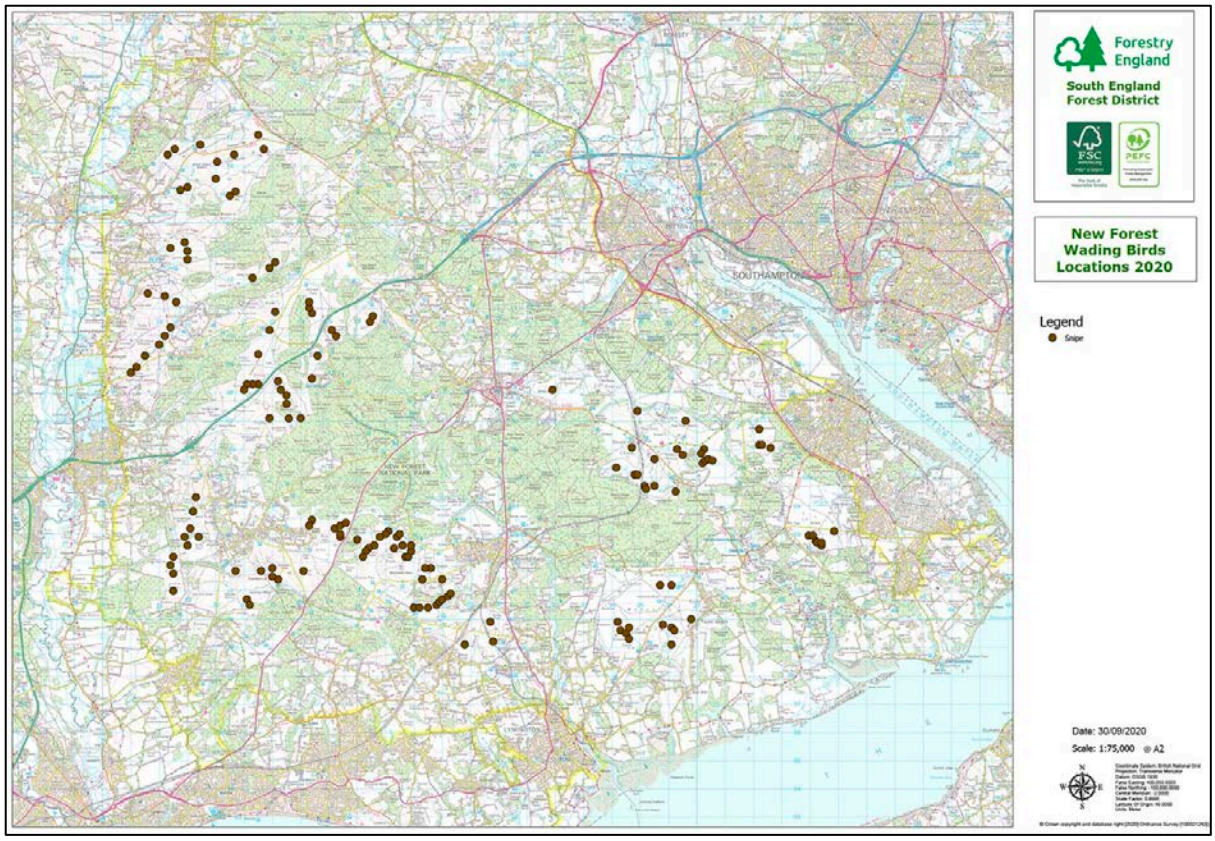

Fig. 3.3.3A: Map showing locations of all Snipe territories in the New Forest in spring 2020 (map produced by Forestry England)

In some locations, e.g. parts of Moonhills valley in Area 11, the drought conditions of spring 2020 saw the habitat become unsuitable for nesting Snipe as the season progressed – this may explain the influx of displaying and/or vocalising birds at some of the wetter sites during Visit 3. However, the data in Table 3.3.3 show the overall totals recorded on all three visits were very similar, suggesting the actual numbers breeding within the SPA were unaffected.

Snipe were most abundant in wetland areas with a mosaic of habitats created by local hydrology and livestock grazing (cf. Tubbs and Tubbs, 1994). Areas with tussock vegetation were most often used for nesting, but the species evidently requires areas of short wet grassland preferably with patches of exposed mud for feeding (e.g. Fig. 3.3.3B and 3.3.3C). Snipe also benefit from the presence of livestock dung and associated invertebrates, with cattle dung in particular often showing evidence for Snipe probing (Fig. 3.3.3C).

Conversely, sites with relatively homogeneous vegetation cover, e.g. *Molinia* grass, usually contained no Snipe territories, perhaps most notably in the extensive areas of bog in the Shatterford Bottom, Stephill Bottom and Bishop's Dyke sections of Area 13 (Fig. 3.3.3D). This was also noted by Tubbs and Tubbs (1994).

Given the Snipe population in the New Forest SPA appears to be relatively stable in the long term, management interventions may be unnecessary and of lower priority when compared to those required for some of the rapidly declining species, especially as changes to grazing regimes and long-term climate change (e.g. increased incidence of drought), would appear to be the most pertinent threats.

Fig, 3.3.3B: Snipe nest with four eggs at Dibden Bottom on 09 June 2020, showing (left) general location of nest in line of tussocks separating heavily poached and exposed mud in the foreground and well-vegetated bog in the background, and (right) detail of nest within sedge/rush tussock with sphagnum moss and grasses

Fig. 3.3.3C: Cattle dung at Broomy Bottom showing the characteristic 'pincushion' pattern of probing Snipe; note also the presence of permanently wet and relatively open ground in the floor of this small valley, evidenced by the abundance of emerging Marsh St John's Wort

Fig. 3.3.3.D: Upper image looking north shows an area at Stephill Bottom where standing water and dark muddy patches separate the damp heath (right) from dense Molinia tussocks and willow/alder carr (left); there is just enough habitat here to support one or two Snipe territories, probably aided by livestock poaching along the margin of the mire as evidence by multiple linear tracks; lower image was taken a few tens of metres from that above, but looking south, and shows an area of more homogenous Molinia habitat where there is insufficient open ground to support any Snipe (or other wader) territories

3.3.4. Redshank

Only seven Redshank territories were located (Table 3.3.4), all in the southeast of the New Forest on Beaulieu Heath (six east and one west). A pair was seen at Woodfidley Passage (Area 13) on Visit 2 but they didn't linger. There was zero productivity, with none remaining on Beaulieu Heath - East by Visit 3, although the remains of a predated adult were found at the top of Moonhills valley (Fig. 3.3.4A). A pair nested near the west end of Hatchet Pond but subsequently failed, with recreational disturbance a likely factor.

Area	Visit 1	Visit 2	Visit 3	**Total**
1	0	0	0	**0**
2	0	0	0	**0**
3	0	0	0	**0**
4	0	0	0	**0**
5	0	0	0	**0**
6	0	0	0	**0**
7	0	0	0	**0**
8	0	0	0	**0**
9	0	0	0	**0**
10	1	1	1	**1**
11	4	6	0	**6**
12	0	0	0	**0**
13	0	1	0	**0**
14	0	0	0	**0**
15	0	0	0	**0**
16	0	0	0	**0**
Total	**5**	**8**	**1**	**7**

Table 3.3.4: Number of Redshank territories seen in each area during each visit, and final total

Redshank seem to prefer areas of permanently wet mire containing pools (small or large) with muddy margins for foraging, usually generated through livestock poaching (*cf*. Tubbs and Tubbs, 1994). Although this habitat is found at several locations in the New Forest, their distribution in the far southeast of the New Forest (Fig. 3.3.4B) may also be related to nearby breeding colonies on the adjacent coast, as on multiple occasions birds were observed leaving Beaulieu Heath - East and flying high south towards the coast (this was also noted by Tubbs and Tubbs, 1994)

The future status of this species as a breeding bird in the New Forest SPA seems perilous, given the issues around predation, recreational disturbance, and drying out of their preferred habitats as documented here.

Fig. 3.3.4A: Remains of a predated Redshank found on Beaulieu Heath - East on 08 June 2020

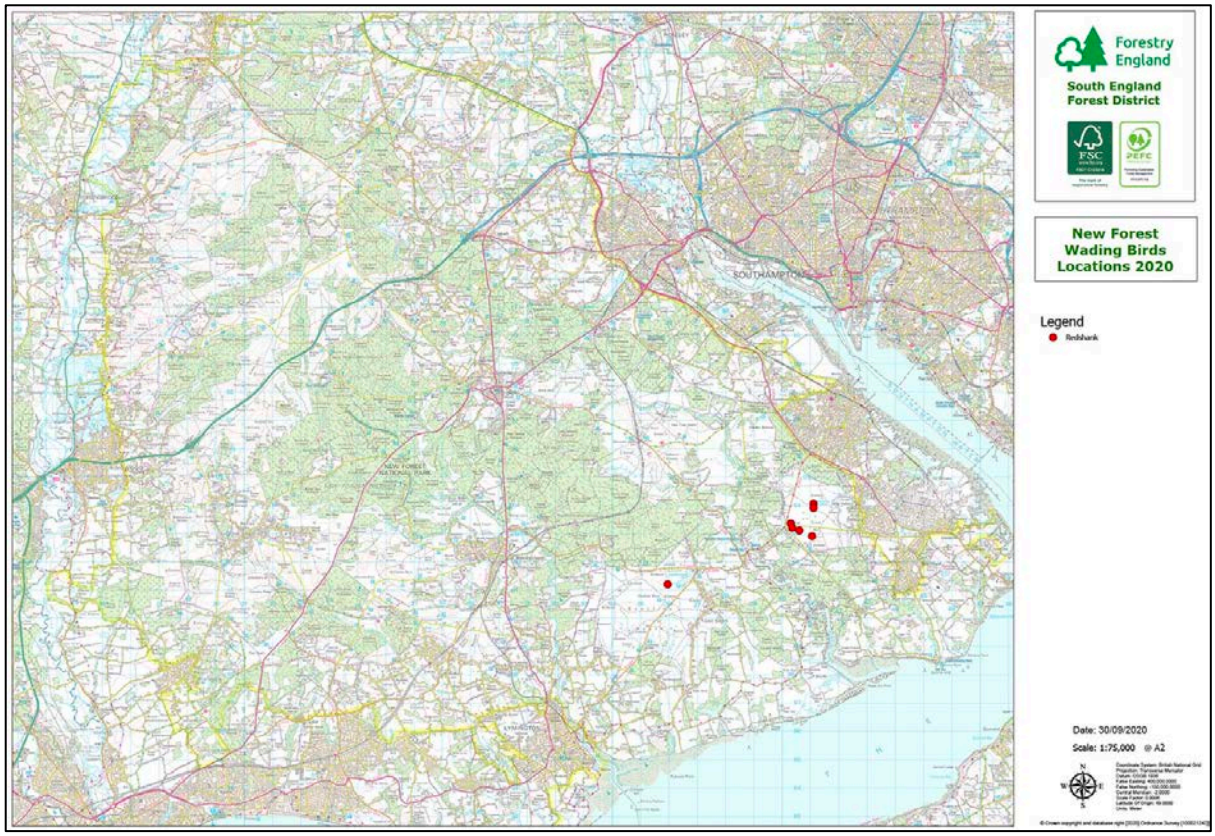

Fig. 3.3.4B: Map showing locations of all Snipe territories in the New Forest in spring 2020 (map produced by Forestry England)

4. Analysis

4.1. Wader totals

Based on survey data collected in spring 2020, combined with a small number of supplementary reports, the breeding wader assemblage in the New Forest SPA is currently in the order of 270 territories. This is a dramatic reduction when compared to previous surveys over the last three decades, which all recorded between 340 and 400 territories (Tubbs and Tubbs, 1994; Goater et al., 2004; Lake et al., 2020). The change in status is mostly driven by relatively recent declines in the Curlew and Lapwing population (Wynn, 2020), as Snipe appear to be stable and Redshank numbers have always been <20 territories.

4.2. Wader distributions and habitats

As outlined in the previous species accounts, wader distributions are heterogeneous across the New Forest. Curlew and Snipe are relatively widespread, whereas Lapwing and particularly Redshank are concentrated in the south and east of the New Forest (Fig. 4.2).

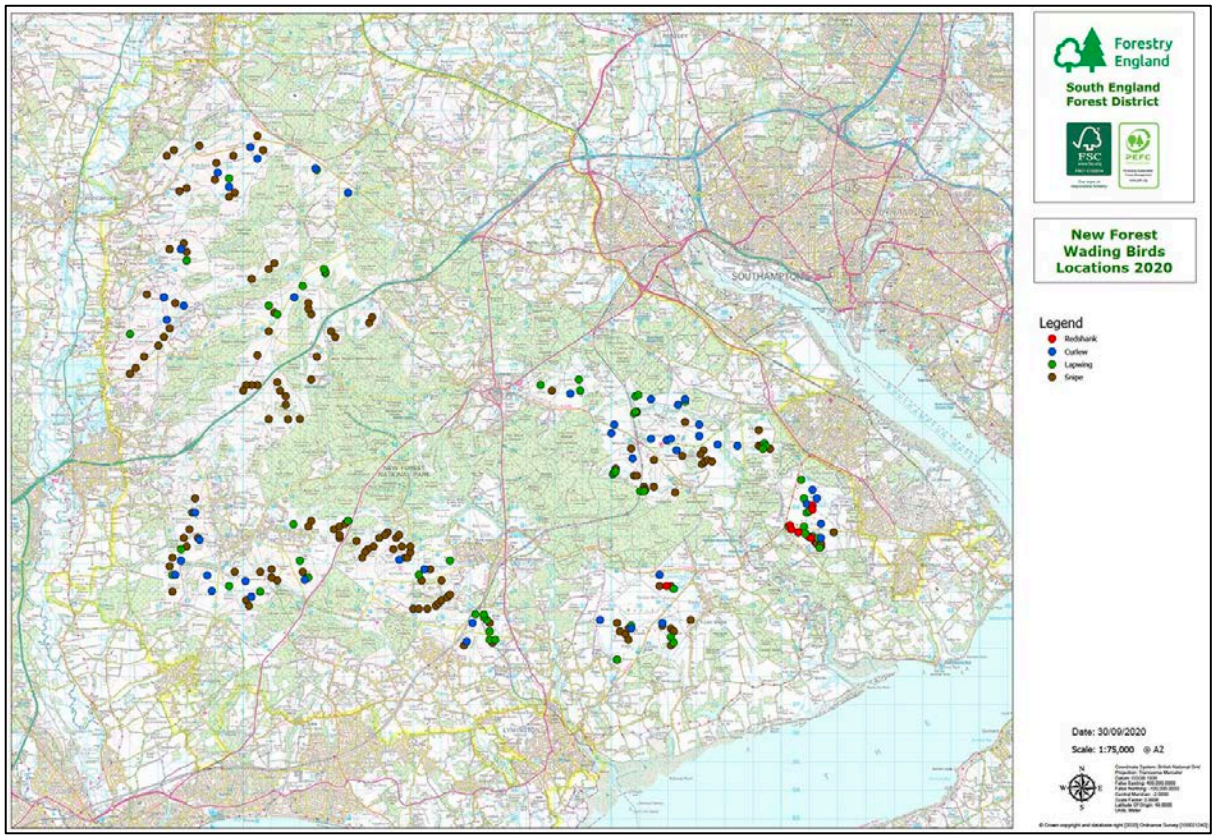

Fig. 4.2: Map showing locations of all breeding wader territories in the New Forest in spring 2020 (map produced by Forestry England)

The heterogeneous nature of these distributions may help to target future management interventions, particularly for Curlew and Redshank which tend to be most impacted by recreational users due to high flight initiation distances and proximity to recreation hotspots. For example, 13 Curlew territories (>25% of the total New Forest population) were located

within 2.5 km of Beaulieu Road Station, and the seven Redshank territories were all on Beaulieu Heath (East and West).

Although there are some areas (Fig. 4.2) where all four breeding wader species can be found in close proximity, e.g. Moonhills valley (Area 11) and the west end of Hatchet Pond (Area 10), they generally have quite specific habitat requirements (see Section 3.3). The importance of different management and grazing regimes in controlling wader distributions was evident during the survey work. For example, Snipe seemed to favour bogs where the vegetation has been opened up through grazing, especially where there are poached muddy margins and insect-rich dung for foraging; conversely, they were not present where there was continuous vegetation cover.

4.3. Potential predators

Carrion Crows were the commonest potential predators recorded, being almost an order of magnitude more abundant than the next species (Table 4.3A). The highest numbers tended to be associated with concentrations of cattle and other livestock, with the highest density in the Matley area (Area 15) associated with supplementary feeding sites for cattle. Buzzards were present at low density in almost all areas, with more aggregate sightings in those areas containing nesting pairs. Ravens were also present in most areas, again with highest aggregate numbers occurring where breeding and non-breeding pairs were in residence. The latter two species are effective predators of wader chicks, so the presence of particular concentrations between Beaulieu Road Station and Beaulieu Heath - East (Areas 11, 12 and 13; Table 4.3A) may be significant.

A survey of breeding Ravens in the New Forest was initiated by Wild New Forest in spring 2020 to assess their current status, particularly in light of the potential threat they pose to breeding waders and other ground-besting birds. The first year of data indicates a breeding population of at least 17 pairs spread across the whole New Forest, with a further seven or eight pairs of non-breeding territorial birds. The total Raven population in the New Forest in late spring (when wader chicks begin to appear) is probably now in the order of 80-100 individual birds, a dramatic increase when one considers that first breeding in the New Forest only occurred in 2003 (Eyre, 2015).

Other avian predators recorded included small numbers of Goshawk, Red Kite and Marsh Harrier, with the latter observed actively hunting chicks of ground-nesting birds at Beaulieu Heath - West. Foxes are largely nocturnal and consequently only six were recorded during the survey period (Fig. 4.3).

Area	Fox	Raven	Carrion Crow	Buzzard	Other
1	0	0	20	1	0
2	0	3	67	6	0
3	0	0	40	11	0
4	0	1	24	8	0
5	0	0	6	5	0
6	1	2	11	5	2
7	2	4	59	6	1
8	0	3	74	7	3
9	0	3	22	0	0
10	1	0	80	5	2
11	0	15	68	6	4
12	0	12	53	11	0
13	0	11	51	12	4
14	0	2	33	2	0
15	2	0	118	4	0
16	0	0	8	2	0
Total	6	56	734	91	16

***Table 4.3A**: Numbers of different potential predator species in each area*

***Fig. 4.3**: Fox and grazing cattle in the bog at White Moor at dusk on 21 May 2020*

Given that Carrion Crows are the dominant potential predator species, they will be the main driver of the temporal distribution seen in Table 4.3B below, with progressively lower numbers noted over the survey period reflecting break-up of wintering flocks. However, there

was still a substantial population of breeding pairs and non-breeding birds during Visit 3, at a time when most breeding waders are nesting or guarding chicks.

Area	Visit 1	Visit 2	Visit 3	Aggregate
1	8	6	7	21
2	25	34	17	76
3	20	17	14	51
4	14	4	16	34
5	2	5	4	11
6	5	10	6	21
7	40	21	11	72
8	31	23	33	87
9	11	6	8	25
10	36	30	22	88
11	28	33	32	93
12	22	25	30	77
13	31	23	24	78
14	13	9	15	37
15	51	39	34	124
16	3	3	4	10
Total	340	294	277	

***Table 4.3B**: Numbers of potential predators recorded in each area during each visit*

4.4. Observed patterns of recreational use

Although the collected data on recreational users are not sufficiently robust for detailed analysis (e.g. due to variations in the size of each area and the route covered), they are broadly consistent with recent studies specifically investigating recreational use patterns in the New Forest (e.g. Lake et al., 2008; Sharp et al., 2020). This survey was also focussed on the early morning and evening periods when breeding waders are generally most active, and therefore provides some useful insights into recreational use at these times.

Table 4.4A above shows the numbers of recreational users recorded in each area during the three visits. As expected, the total number of recreational users almost doubled during Visit 3 once access restrictions were eased. Areas 1, 2 and 10 had the highest aggregate numbers of recreational users and dogs over the three visits; these areas are all in the southern New Forest and easily accessed from towns and villages including Lymington, Brockenhurst and Sway. The lowest numbers were in Areas 4, 5, 6, 9 and 16, which are mostly in the centre and west of the New Forest bordering the A31, with reduced access and greater distance to settlements.

Area	Visit 1	Visit 2	Visit 3	Aggregate
1	27 (19 dogs)	25 (22 dogs)	46 (18 dogs)	98 (59 dogs)
2	35 (15 dogs)	25 (22 dogs)	33 (21 dogs)	93 (58 dogs)
3	29 (19 dogs)	7 (5 dogs)	19 (8 dogs)	55 (32 dogs)
4	4 (0 dogs)	7 (4 dogs)	7 (3 dogs)	18 (7 dogs)
5	1 (0 dogs)	0 (0 dogs)	1 (0 dogs)	1 (0 dogs)
6	5 (3 dogs)	3 (3 dogs)	13 (4 dogs)	21 (10 dogs)
7	11 (4 dogs)	20 (9 dogs)	29 (13 dogs)	60 (26 dogs)
8	13 (13 dogs)	16 (8 dogs)	27 (23 dogs)	56 (44 dogs)
9	3 (1 dog)	2 (0 dogs)	7 (6 dogs)	12 (7 dogs)
10	22 (20 dogs)	14 (8 dogs)	60 (13 dogs)	96 (41 dogs)
11	9 (3 dogs)	23 (22 dogs)	15 (11 dogs)	47 (36 dogs)
12	19 (10 dogs)	16 (10 dogs)	24 (15 dogs)	59 (35 dogs)
13	19 (3 dogs)	27 (4 dogs)	24 (13 dogs)	70 (20 dogs)
14	6 (1 dog)	9 (3 dogs)	32 (14 dogs)	47 (18 dogs)
15	19 (6 dogs)	10 (4 dogs)	34 (9 dogs)	63 (19 dogs)
16	0 (0 dogs)	4 (2 dogs)	3 (2 dogs)	7 (4 dogs)
Total	203 (117 dogs)	208 (125 dogs)	374 (173 dogs)	

***Table 4.4A**: Numbers of recreational users (and dogs) recorded in each area during each visit*

Dog-walkers were the dominant recreational users observed (Table 4.4B), accounting for 58% of all users (with an average of about one dog per walker). Walkers without dogs accounted for 29% and cyclists 10%, with smaller numbers of runners, horse-riders and other users. The highest concentration of dog-walkers was in Areas 1 and 2, which are accessed directly from Brockenhurst and Sway and a large number of official car parks. Numbers of walkers were highest around Hatchet Pond (Area 10), Beaulieu Road Station (Area 13) and Longwater Lawn near Lyndhurst (Area 15), while off-road cyclists were concentrated in the area between Lyndhurst and Beaulieu.

Given that Visits 1 and 2 took place during the period of COVID-19 access restrictions, then it is likely that local dog-walkers are over-represented in the above dataset. This is supported by the observation that walkers and cyclists in particular were proportionately more important during Visit 3, after access restrictions were lifted. Local dog-walkers are also potentially more likely to be active in the early morning in particular, compared to other user groups. There may also be a bias in the above data towards increased recreational users in areas that are close to settlements and could therefore be accessed from user's houses during the period of access restrictions, however, the overall distribution of users in all three visits remained broadly similar.

Area	Dog-walker	Walker	Runner	Cyclist	Horse-rider	Other
1	85 (59 dogs)	3	0	6	4	0
2	78 (58 dogs)	4	3	7	1	0
3	31 (32 dogs)	16	0	6	2	0
4	12 (7 dogs)	4	1	1	0	0
5	0	0	0	0	0	1
6	9 (10 dogs)	8	1	1	0	2
7	32 (26 dogs)	12	0	9	3	4
8	38 (44 dogs)	7	7	2	2	0
9	8 (7 dogs)	4	0	0	0	0
10	40 (41 dogs)	48	5	3	0	0
11	27 (36 dogs)	11	4	0	5	0
12	30 (35 dogs)	13	6	10	0	0
13	23 (20 dogs)	25	2	20	0	0
14	22 (18 dogs)	8	6	4	4	3
15	23 (19 dogs)	25	1	14	0	0
16	5 (4 dogs)	2	0	0	0	0
Total	463 (416)	190	36	83	21	10

***Table 4.4B**: Numbers of different types of recreational users (and dogs) in each area*

***Fig. 4.4A**: Matley Bog at dusk on 21 May 2020, showing two walkers and a dog-walker on an unmarked 'bog-margin' trail, with a dog off the lead and several feeding ponies in the bog itself*

Given the above, it is perhaps unsurprising that witnessed incidents of direct disturbance mostly involved dog-walkers and/or their dogs (or runners and horse-riders with dogs) straying from obvious paths into areas where breeding waders were present (Fig. 4.4A). These incidents occurred at several sites but were more prevalent in the southern New Forest where numbers of dog-walkers were highest, particularly those areas adjacent to Brockenhurst, Lyndhurst and on Beaulieu Heath (East and West). Curlew and Lapwing were the most commonly affected species. There were also issues of prolonged disturbance where paths cross sensitive wetland areas (e.g. Setley Pond, Hincheslea Bog, Penny Moor and Dibden Bottom), which are often used by for 'dog-dipping', consequently these areas are avoided by breeding waders. Similar findings were reported 25 years ago by Tubbs and Tubbs (1994), so this is clearly a persistent problem. Finally, although there was only one observed incident of a low-flying motorised paraglider disturbing breeding waders and other wildlife (Fig. 4.4B), such incidents can potentially cover a large area and may be significant (e.g. in previous years, similar incidents have caused major disturbance to multiple pairs of breeding Curlews).

***Fig. 4.4B**: This low-flying motorised paraglider was one of a pair passing over the Hasley Hill area on the evening of 15 June 2020, causing significant disturbance to breeding Curlews, other birds, and livestock*

4.5. Did reduced recreational use impact breeding waders?

This study has provided useful data on the breeding wader population in the New Forest, and supplementary data on potential predators and recreational users. Combined, these data contribute to the testing of the hypothesis that *reduced recreational use and associated disturbance during the early part of the ground-nesting bird breeding season would lead to changes in bird distribution, behaviour and productivity*.

It is proposed that the clearest indication of a change in these parameters resulting from reduced recreational use was shown by Curlew, which is significant given the recent dramatic decline of this species at a local and national level. For example, the presence of breeding Curlews in the vicinity of Shatterford and Ocknell car parks at all stages of the breeding cycle (i.e. from territory establishment through to chick fledging; Fig. 4.5A) is likely to be a result of these car parks remaining closed from late March to late July, leading to much reduced recreational use in adjacent areas. It is notable (although perhaps just coincidence) that both pairs appear to have successfully fledged young, in a year when probably no more than five pairs achieved this across the New Forest.

Fig. 4.5A*: Juvenile Curlew next to the pines at Shatterford car park on 29 July 2020*

It is also notable that both pairs were regularly seen by the roadside at various stages of the breeding cycle (Fig. 4.5B), reinforcing similar observations at several sites suggesting that Curlews become habituated to traffic on roads (observations in this and previous years also

indicate that Curlews become habituated to recreational users on marked paths, even where these pass within 200 m of a nest site, but are quick to flush and/or alarm call when users stray from these paths).

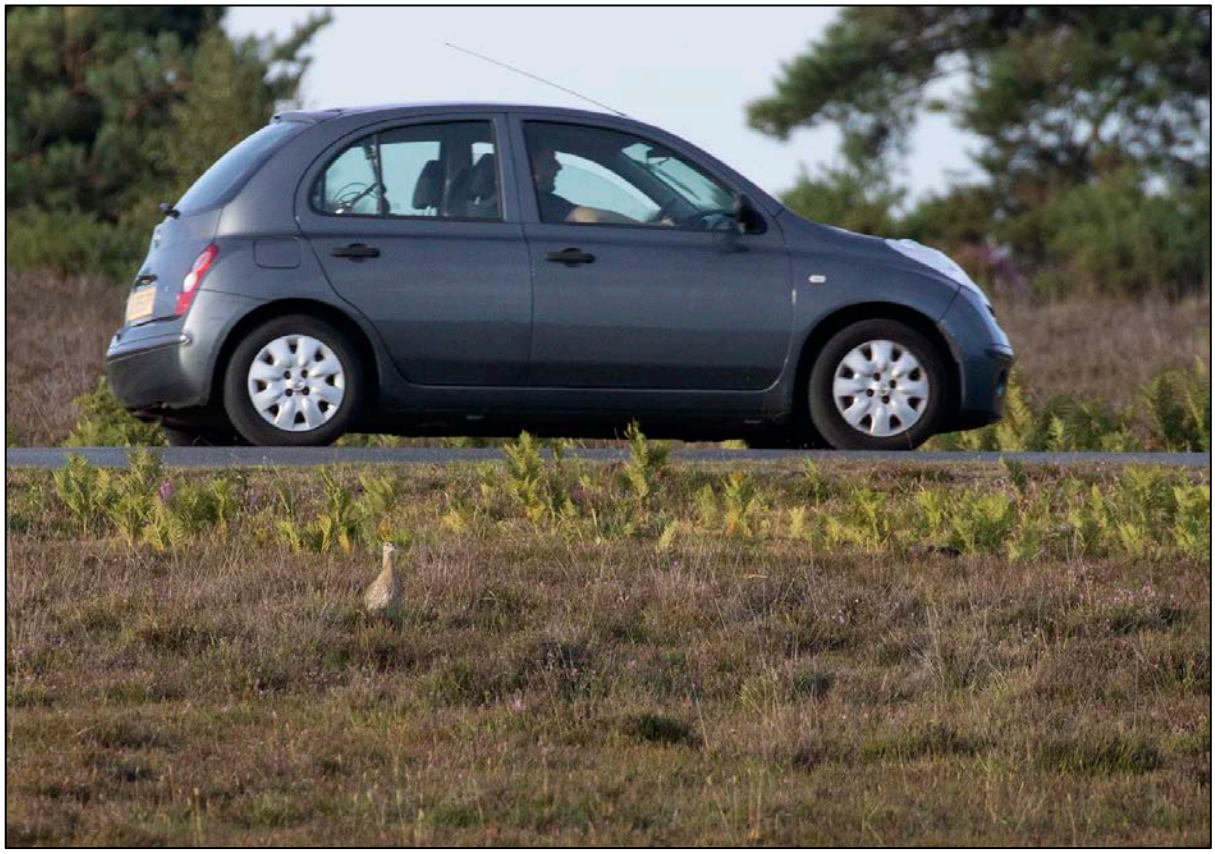

***Fig. 4.5B**: Juvenile Curlew by the roadside close to Shatterford car park on 29 July 2020*

***Fig. 4.5C**: Curlew feeding on Whitefield Moor on 18 Apr 2020, in an area that is usually exposed to high levels of recreational use*

Linked to the above, there were more observations of Curlews feeding on lawns (Fig. 4.5C), roadside verges (Fig. 4.5D) and pond margins (e.g. Whitten Pond) throughout the day compared to previous years; these habitats evidently provide important food resources for Curlews throughout the breeding cycle, but in a normal year are typically only accessed early and late in the day (or at night) when recreational pressure is lower.

***Fig. 4.5D**: Wild Thyme and other flora on a roadside verge at Deadman Hill; these tightly grazed habitats are important for feeding Curlews*

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New Forest: Lockdown easing prompts verge parking fears

30 May 2020 Share

Cars parked on grass verges in the New Forest have been causing "significant" damage to the environment, conservationists have warned.

Visitors have flocked to the national park in Hampshire since coronavirus lockdown restrictions were eased.

The Wild New Forest group said many visitors were unaware of the ecological importance of the verges.

Forestry England (FE) said it had started putting warning stickers on cars parked outside official car parks.

Most car parks in the national park were **closed when the lockdown restrictions were introduced**, although there were reports of people still parking there.

With warm weather in May and the easing of restrictions, there has been an influx of visitors and the reopened car parks have quickly filled up and people have then parked on roadside verges.

It has sparked concerns about people walking over sensitive habitats, as well as restricted access for emergency vehicles when the wildfire risk was high.

Curlew are known to feed on the tightly-grazed lawns which run up to the roadsides in the New Forest

Wild New Forest said the verges "may not look like much", but the tightly grazed lawns sustained plants that attracted insects and invertebrates, which in turn provided food for birds such as curlew.

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New Forest: Threat to ground-nesting birds from visitor influx

23 June 2020 Share

New Forest National Park is considered an important stronghold for birds such as the Dartford warbler

Lockdown restrictions appeared to help rare birds in the New Forest to thrive, but they have been threatened by the subsequent influx in visitors, Forestry England (FE) has warned.

FE said the quiet conditions meant birds such as the Dartford warbler and nightjar nested near empty car parks.

It said the influx of visitors since could have "dramatic effects".

Some car parks have been closed, and walkers and dog owners have been urged to avoid sensitive areas.

A Special Protection Area, the New Forest contains 75% of the UK's lowland bog habitat and is home to ground-nesting bird species which have been lost from other parts of the country.

'Dramatic effects'

Leanne Sargeant, senior ecologist at Forestry England, said the forest had been "hauntingly quiet" in late March and April but an influx of visitors to "bank holiday levels" could disturb the birds.

She said: "This has risked dramatic effects on the forest's rare birds as they had nested closer to some of the car parks and tracks in our absence.

"This disturbance can mean they give up trying to nest at all - and predators such as crows or foxes will quickly investigate if parent birds are forced to leave eggs or chicks,

"Ground-nesting birds are so difficult to spot that many people are simply unaware they are here."

Forestry England said "quieter areas" were being signposted and some car parks near sensitive habitats, including Hincheslea Moor, Shatterford and Clayhill, would remain closed into the summer.

Conservationists have also warned about the **impact on grass verges** and further **damage to the environment** as numbers soared as lockdown restrictions were eased.

***Fig. 4.5D**: BBC News articles highlighting potential impacts of increased visitor numbers post-lockdown on sensitive habitats and ground-nesting birds*

There is insufficient evidence to indicate whether the other breeding waders also experienced positive impacts due to a lack of equivalent data in previous years (whereas Curlews have been intensively surveyed on an annual basis since 2016). For all species, it is also important

to bear in mind that management/grazing regimes, predator pressure, and surface water levels, will also have influenced their distribution, behaviour and productivity in spring 2020, and that these influences are often inter-linked with each other and with recreational use.

However, the easing of access restrictions and the large influx of visitors that occurred in early May in advance of Visit 3 certainly led to obvious negative impacts in some areas. For example, Hatchet Pond featured in local and national media due to the unprecedented influx of visitors at the site (Fig. 4.5D), and during the survey period (and on additional visits) many people were seen walking the circuit around the pond and crossing the western feeder stream where Redshank, Lapwing and Snipe were still attempting to breed. This may have contributed to failure of the breeding Redshanks (especially as this species is known to have a high flight initiation distance) and may also have deterred Oystercatchers from breeding in that area.

Similarly, the large numbers of people accessing the newly opened car parks in the Wilverley area led to increased disturbance of the Curlew pair with chicks from the Five Thorns Hill nest; these chicks were monitored regularly after the survey period by volunteer observers in the Redhill and Holmhill Bog area, and were seen to be disturbed by dogs off the lead and kite-flyers (Fig. 4.5E). A similar situation occurred with the Curlew nest northwest of Pottern Ford after Longdown car park reopened.

Fig. 4.5E*: Photo of Redhill Bog on 20 June 2020, with two people off the path flying a stunt kite in an area where a Curlew pair with chicks were present; additional people are visible on marked paths (photo credit: Andrew Colenutt)*

In summary, it is suggested that breeding Curlew were positively impacted by the reduction in recreational use, particularly linked to seasonal car park closures, but that breeding Curlew, Redshank and possibly Lapwing were negatively impacted by the increase in recreational users once access restrictions were eased.

5. Acknowledgements

We are grateful to Leanne Sargeant (Forestry England) for enabling us to undertake this work at short notice, and to Andy Page (Forestry England) for invaluable fieldwork support throughout the survey period. PhD student, Elli Rivers, funded by GWCT and Bournemouth University, supported the monitoring of Curlew productivity as part of her project fieldwork. Finally, we would like to thank everyone who contributed sightings of breeding waders in the survey period, particularly Andrew Colenutt and Helen Schneider for their assistance with Curlew nest and chick monitoring in the Holmhill and Redhill Bog area.

6. References

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Appendix A: Detailed locations of all mapped territories (ten-figure grid refs)

Area	Species	SU or SZ	Grid ref	Observation
1	Curlew	SZ	2909499893	Nest
1	Curlew	SZ	2889099240	Nest
2	Curlew	SU	2650602131	Nest
2	Curlew	SU	2740001800	Nest
3	Curlew	SU	2317101423	Nest
3	Curlew	SU	2107701379	Nest
3	Curlew	SU	2128400819	Nest
4	Curlew	SU	1972901582	Nest
4	Curlew	SU	1988901022	Nest
4	Curlew	SU	1860001600	Territory
4	Curlew	SU	1945902840	Nest
4	Curlew	SU	1880002100	Territory
4	Curlew	SU	1930003800	Territory
4	Curlew	SU	1990092500	Territory
6	Curlew	SU	2280011400	Territory
7	Curlew	SU	1890011100	Territory
7	Curlew	SU	1830010600	Territory
7	Curlew	SU	1820011400	Territory
7	Curlew	SU	1880013100	Territory
8	Curlew	SU	2125016700	Territory
8	Curlew	SU	2150016300	Territory
8	Curlew	SU	2010015800	Territory
8	Curlew	SU	2050015300	Territory
9	Curlew	SU	2355015950	Territory
9	Curlew	SU	2470015100	Territory
10	Curlew	SU	3360000000	Territory
10	Curlew	SZ	3470099700	Territory
10	Curlew	SZ	3580099900	Territory
10	Curlew	SU	3570001600	Territory
11	Curlew	SU	4110004600	Defending
11	Curlew	SU	4125004300	Territory
11	Curlew	SU	4140003400	Defending
11	Curlew	SU	4090004100	Chicks
11	Curlew	SU	4140002900	Territory
12	Curlew	SU	3845006150	Defending
12	Curlew	SU	3710006900	Nest
12	Curlew	SU	3710006500	Defending
12	Curlew	SU	3775006200	Defending
13	Curlew	SU	3410006900	Chicks
13	Curlew	SU	3400006600	Defending
13	Curlew	SU	3475005700	Fledged
13	Curlew	SU	3540006400	Territory
13	Curlew	SU	3595006350	Chicks

13	Curlew	SU	3610006400	Territory
13	Curlew	SU	3630006000	Territory
14	Curlew	SU	3540007800	Territory
14	Curlew	SU	3635007600	Defending
14	Curlew	SU	3660007800	Territory
15	Curlew	SU	3255008000	Defending
1	Lapwing	SZ	2970099300	Chicks
1	Lapwing	SZ	2990099300	Territory
1	Lapwing	SZ	2970099600	Territory
1	Lapwing	SU	2960000000	Territory
1	Lapwing	SU	2950000100	Territory
1	Lapwing	SU	2950000200	Chicks
1	Lapwing	SU	2920000200	Territory
2	Lapwing	SU	2830002100	Chicks
2	Lapwing	SU	2720001600	Chicks
3	Lapwing	SU	2300002100	Chicks
3	Lapwing	SU	2330001500	Chicks
3	Lapwing	SU	2160001000	Territory
3	Lapwing	SU	2050001200	Chicks
3	Lapwing	SU	2277203383	Territory
3	Lapwing	SU	2470003500	Territory
3	Lapwing	SU	2470003500	Chicks
3	Lapwing	SU	2470003500	Chicks
4	Lapwing	SU	1850001600	Nest
4	Lapwing	SU	1850001600	Nest
4	Lapwing	SU	1880002500	Territory
6	Lapwing	SU	2390012250	Chicks
6	Lapwing	SU	2390012300	Chicks
6	Lapwing	SU	2385012400	Chicks
6	Lapwing	SU	2310011800	Territory
6	Lapwing	SU	2190011100	Defending
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11	Lapwing	SU	4090003800	Territory
11	Lapwing	SU	4080004300	Territory
11	Lapwing	SU	4100003850	Chicks

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11	Lapwing	SU	4035003200	Territory
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11	Lapwing	SU	4135002550	Defending
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12	Lapwing	SU	3945006150	Defending
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13	Lapwing	SU	3405005150	Territory
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14	Lapwing	SU	3485007350	Chicks
14	Lapwing	SU	3485007900	Chicks
14	Lapwing	SU	3495007950	Chicks
14	Lapwing	SU	3660007700	Defending
15	Lapwing	SU	3150008300	Territory
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15	Lapwing	SU	3290008100	Chicks
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5	Snipe	SU	2130008300	Territory
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16	Snipe	SU	2425010000	Territory
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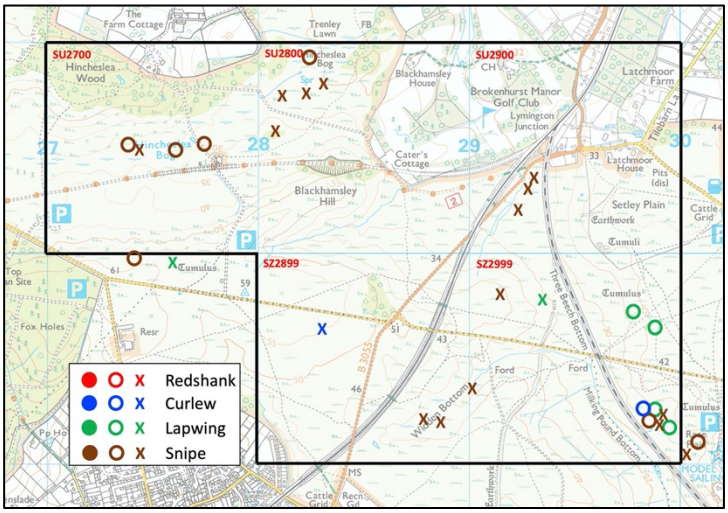
Appendix B: Base maps for all areas for Visits 1-3

Area 1:

Visit 1



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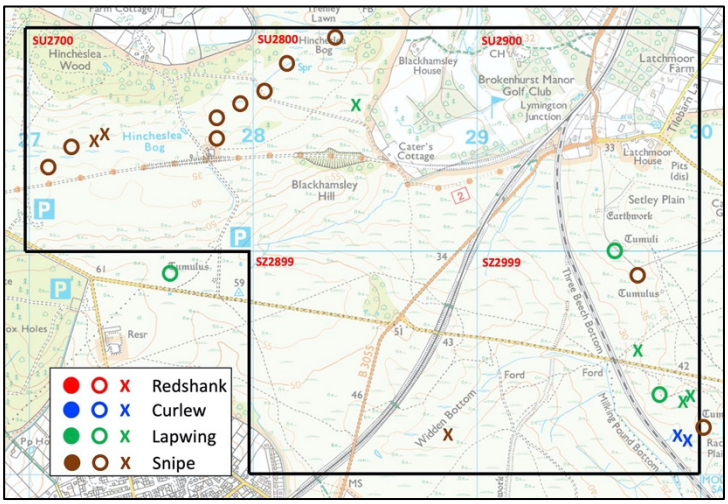

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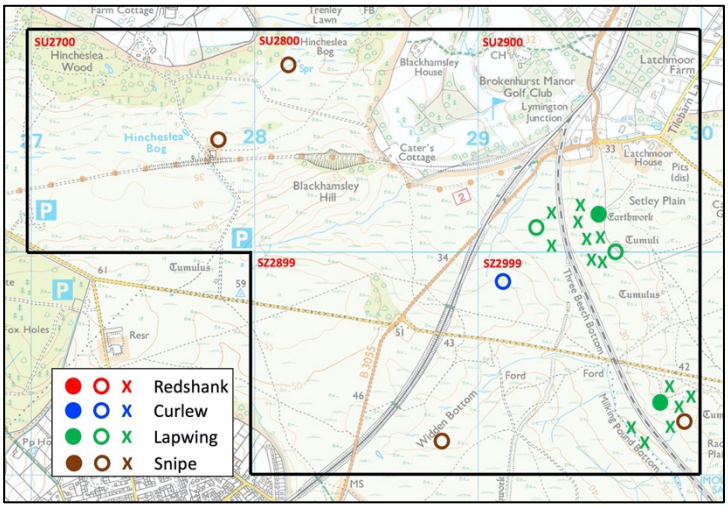

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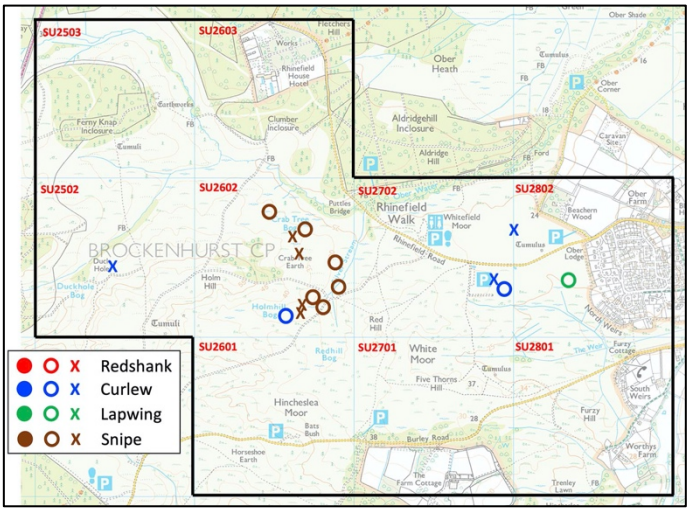

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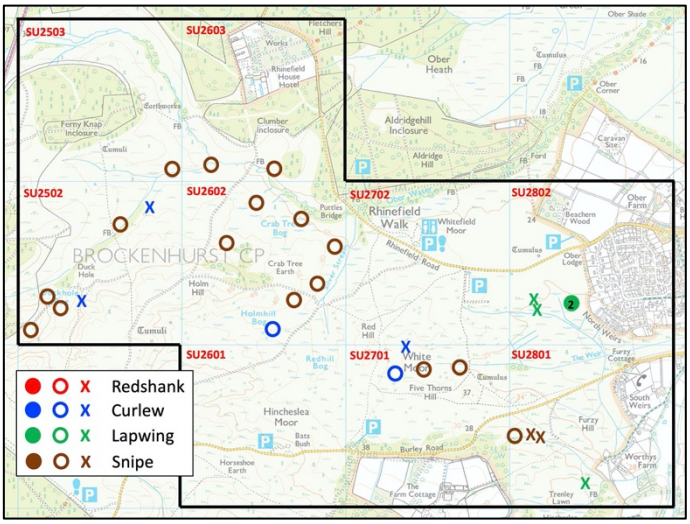

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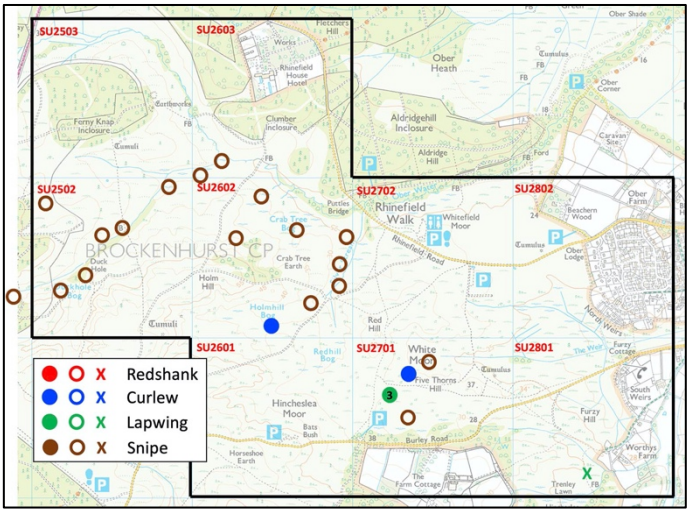

Area 3a:

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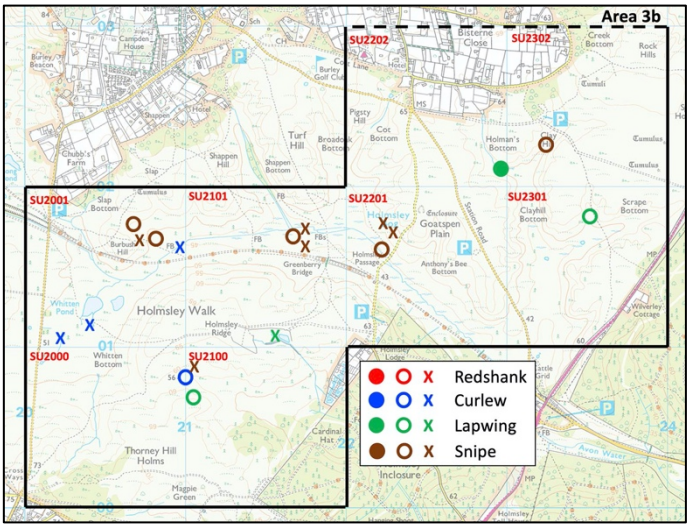

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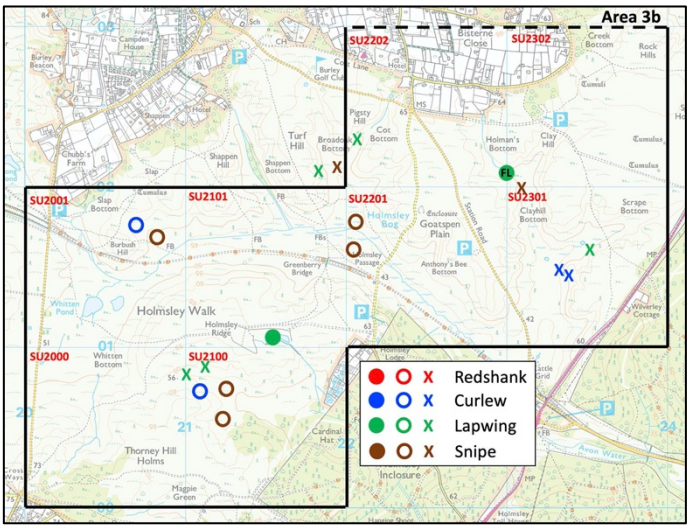

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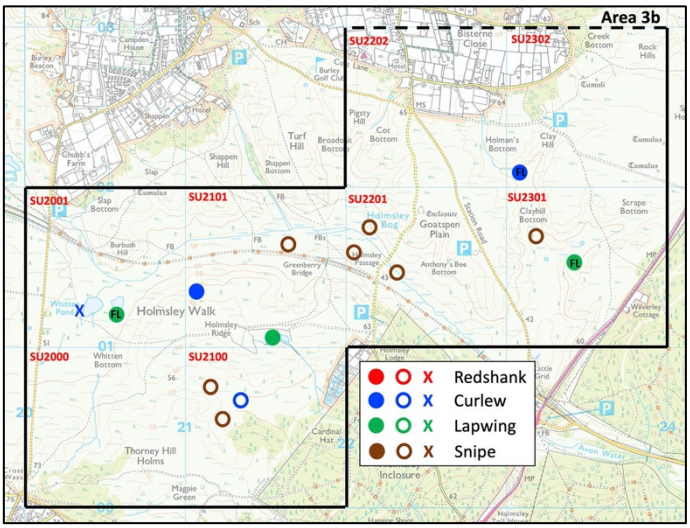

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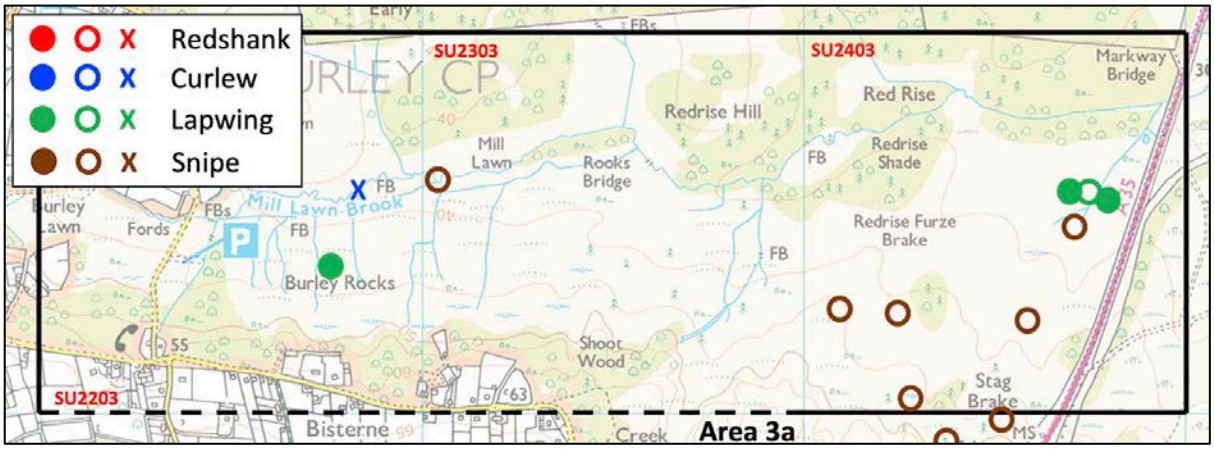

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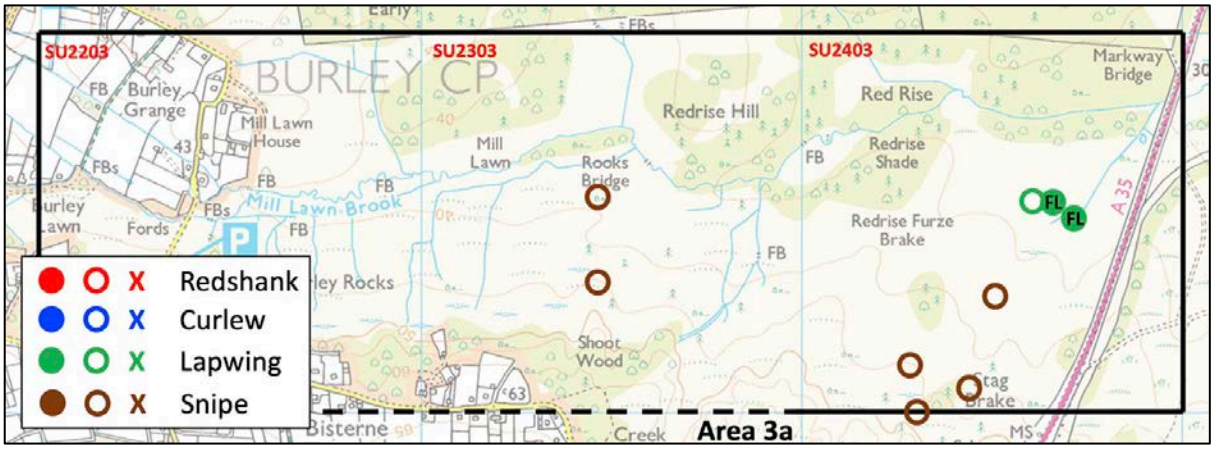

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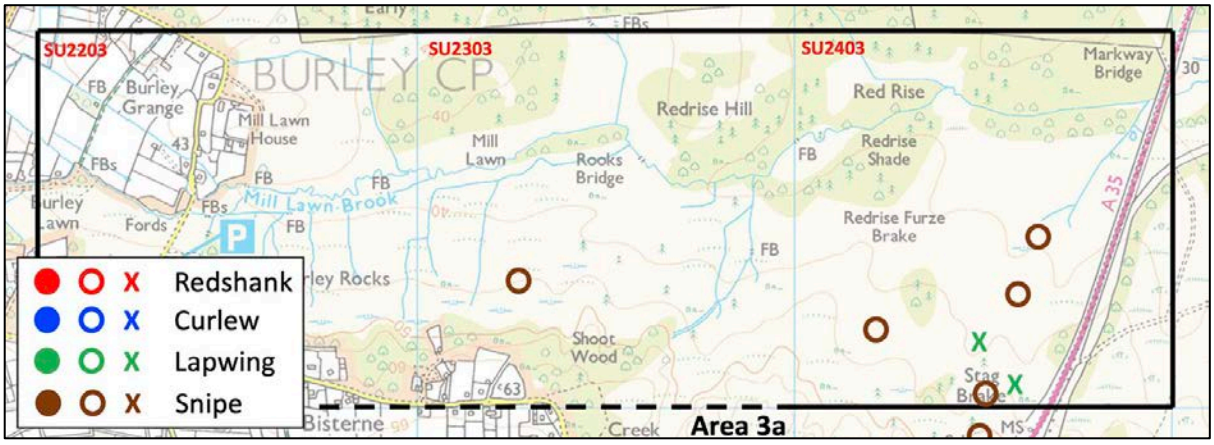

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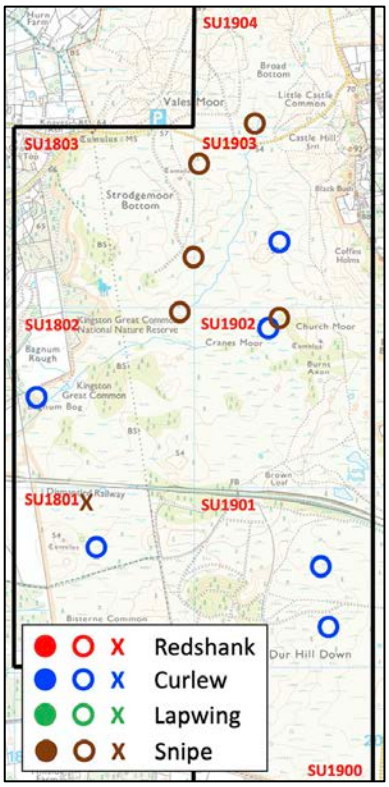

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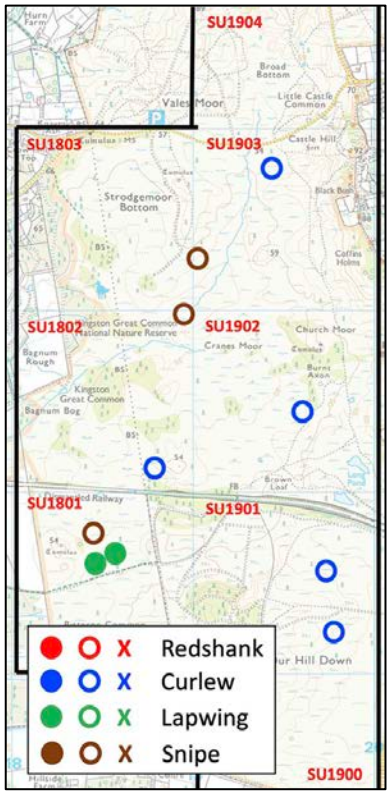

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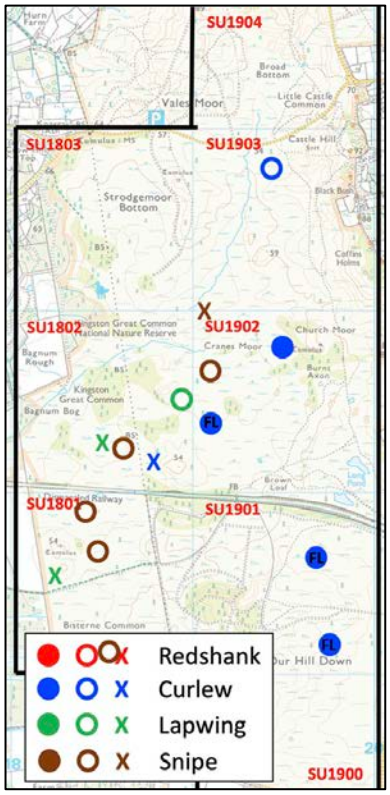

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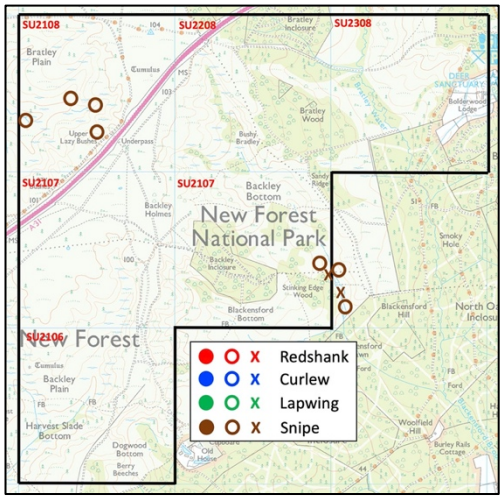

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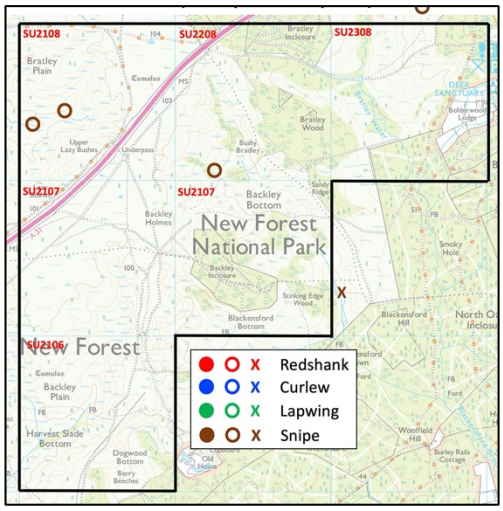

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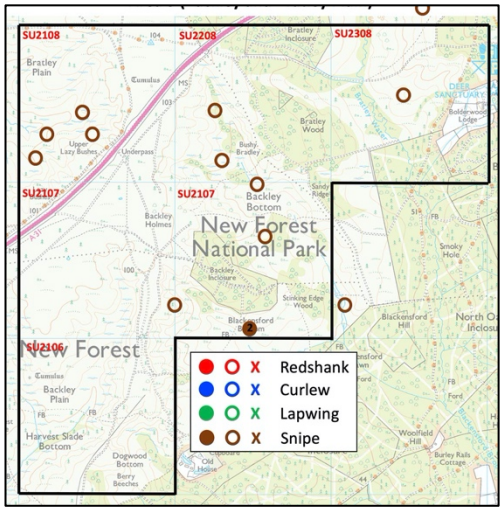

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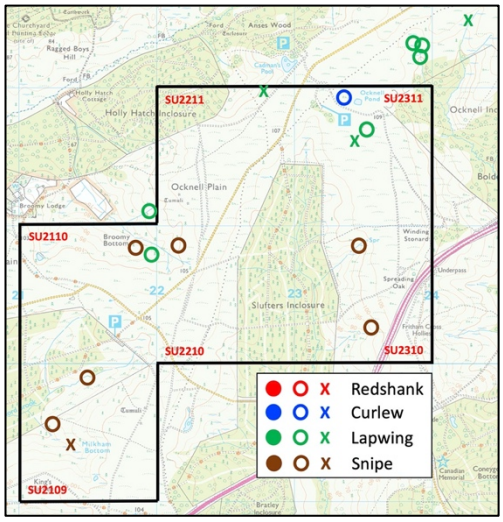

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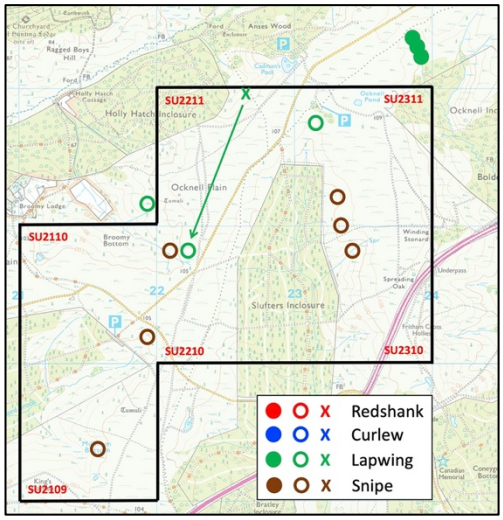

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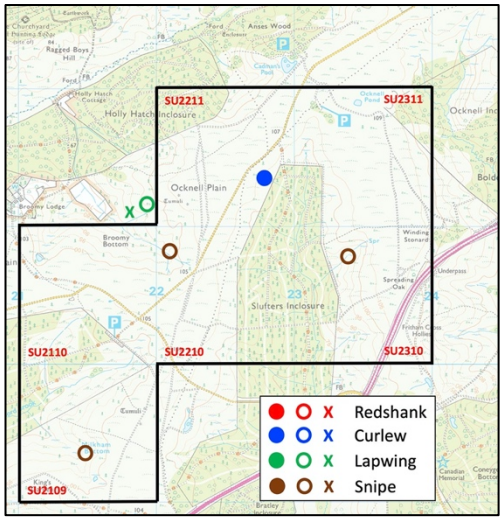

Area 7a:

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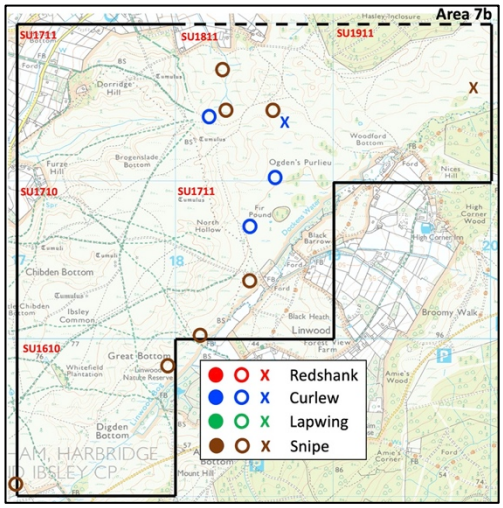

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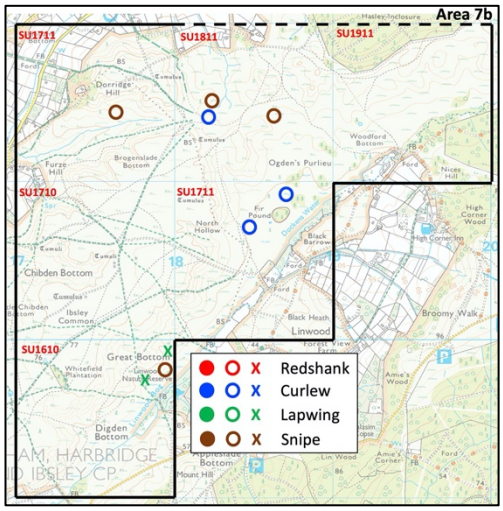

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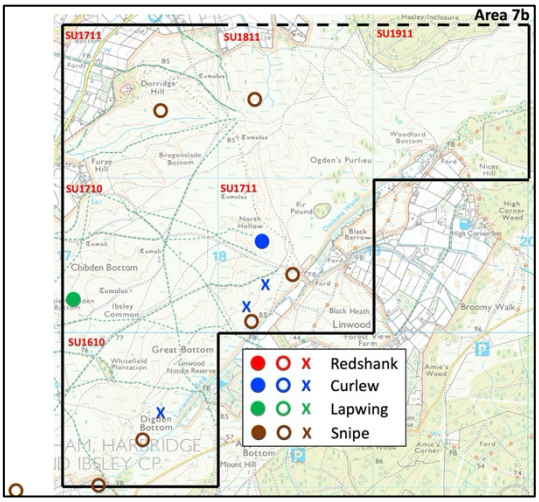

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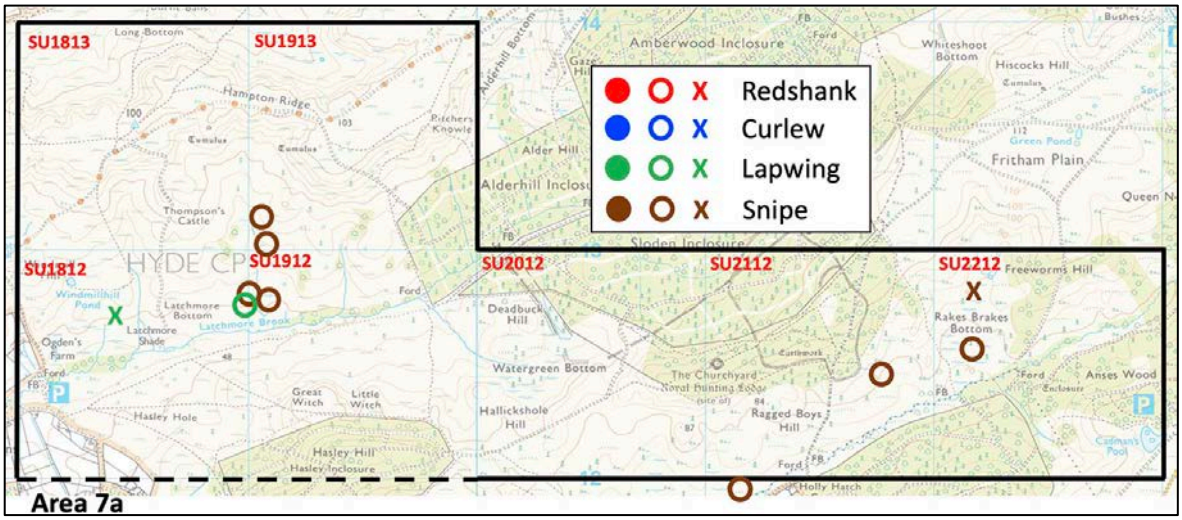

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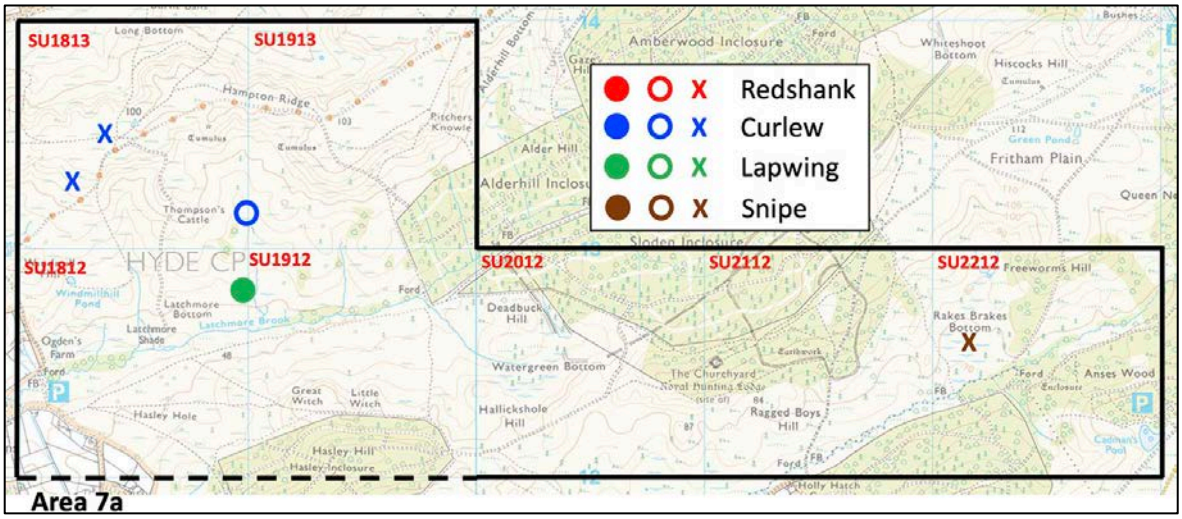

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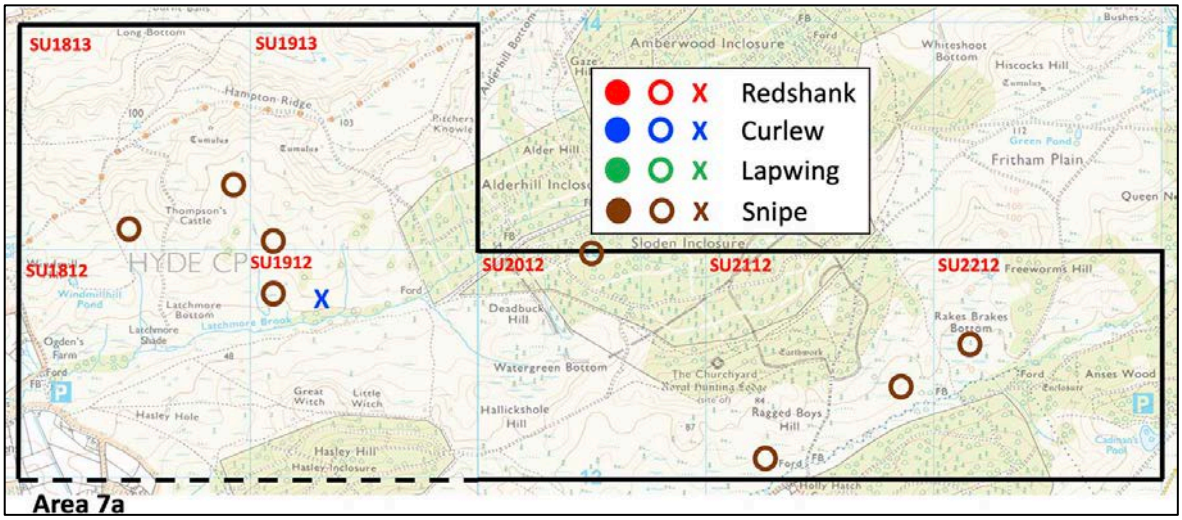

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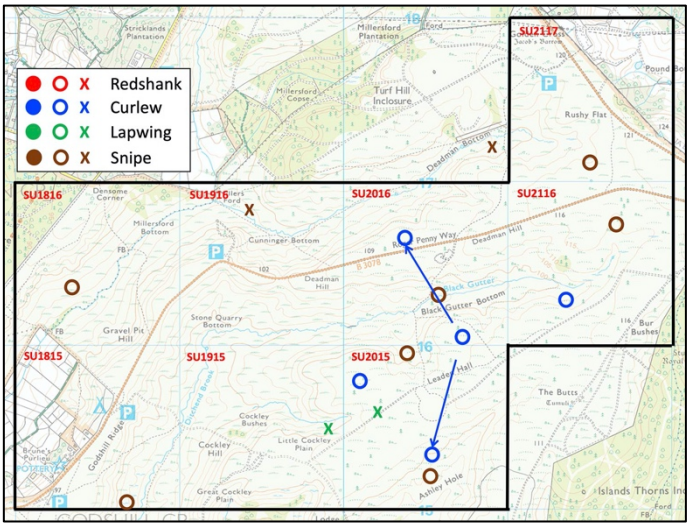

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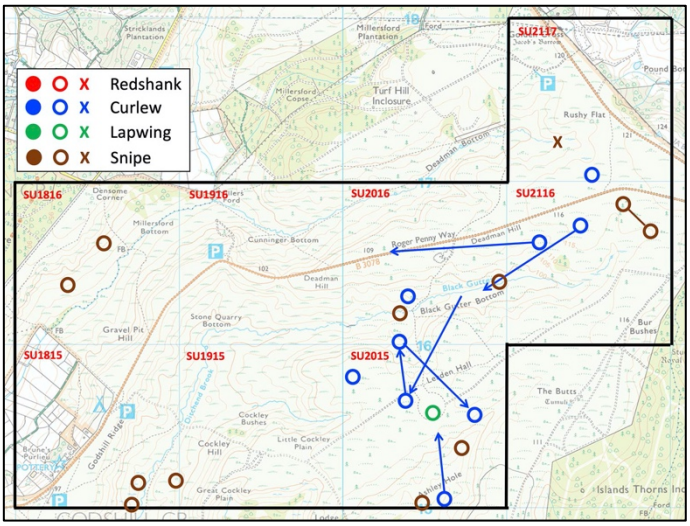

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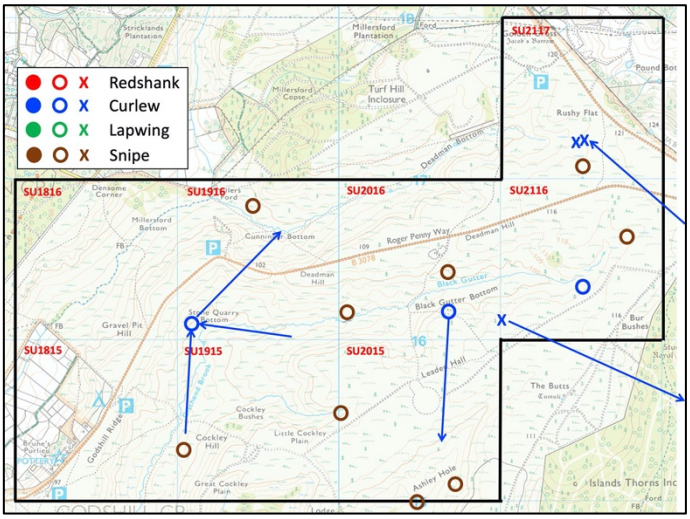

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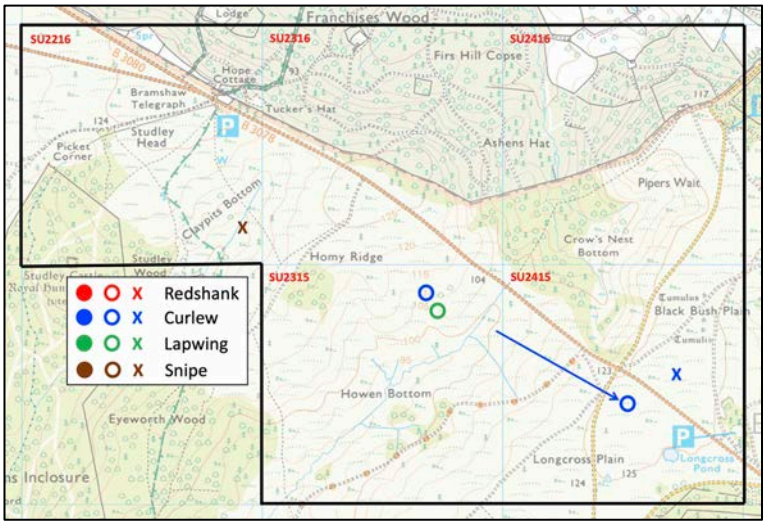

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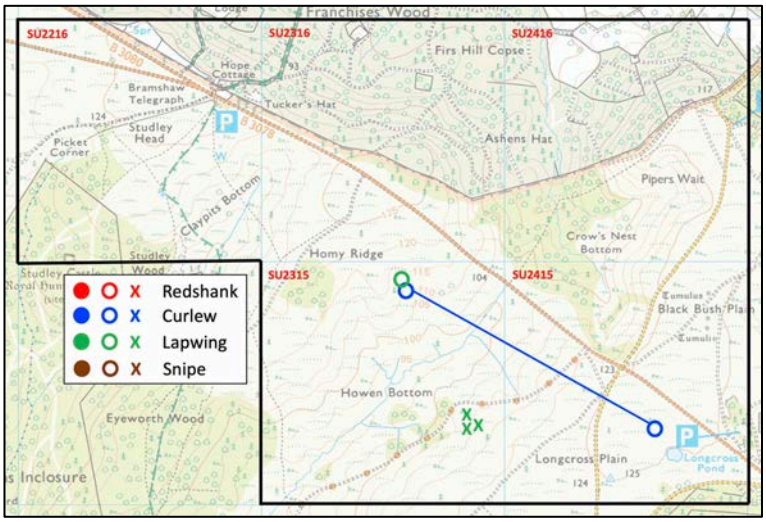

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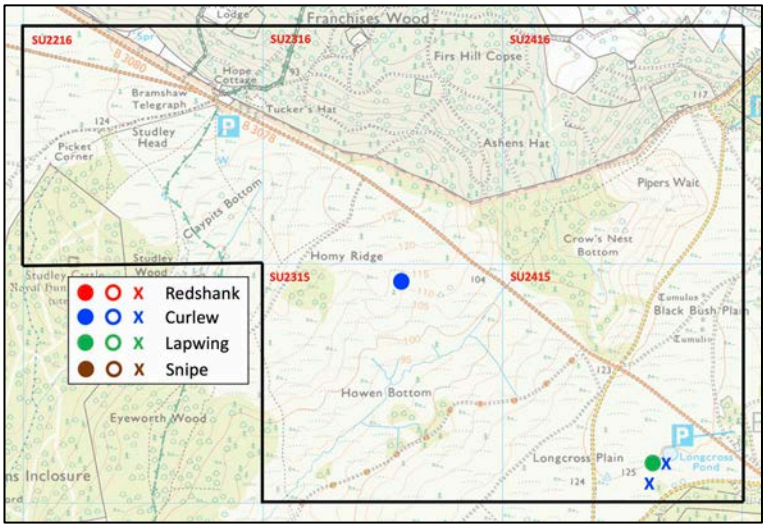

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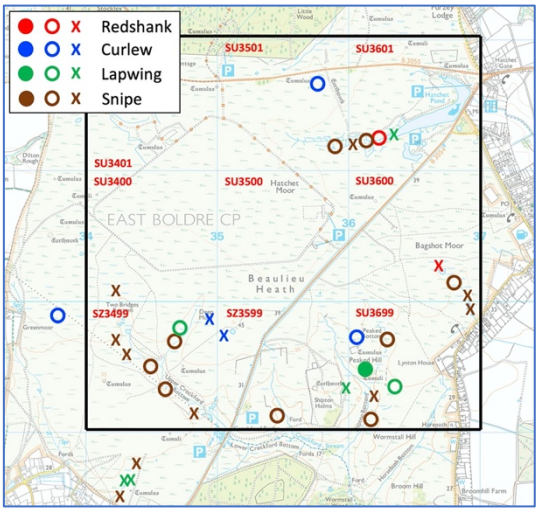

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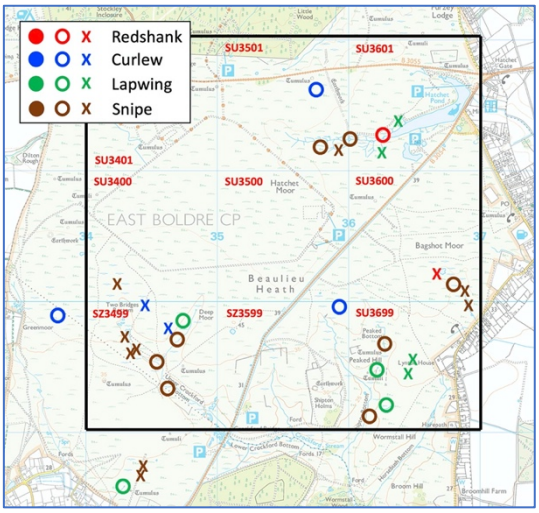

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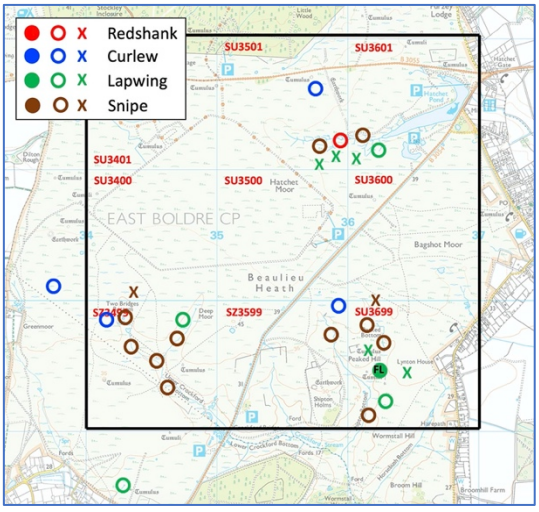

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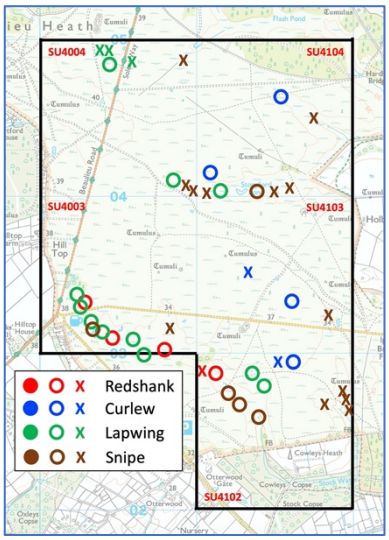

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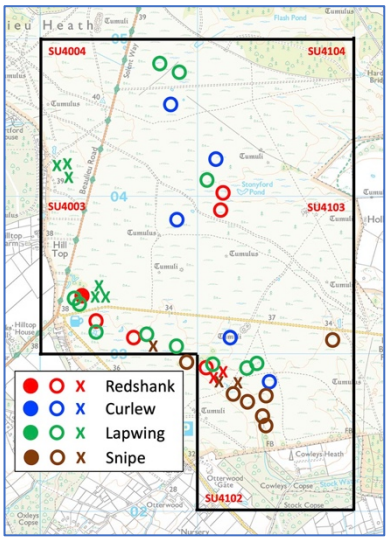

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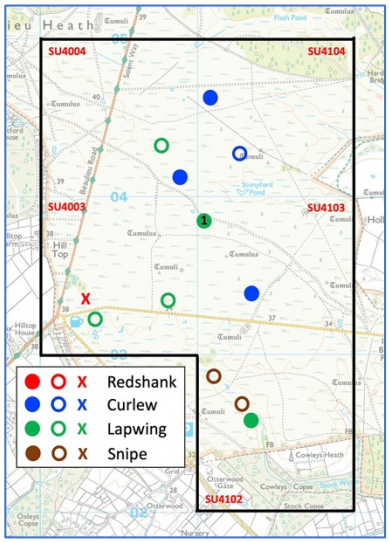

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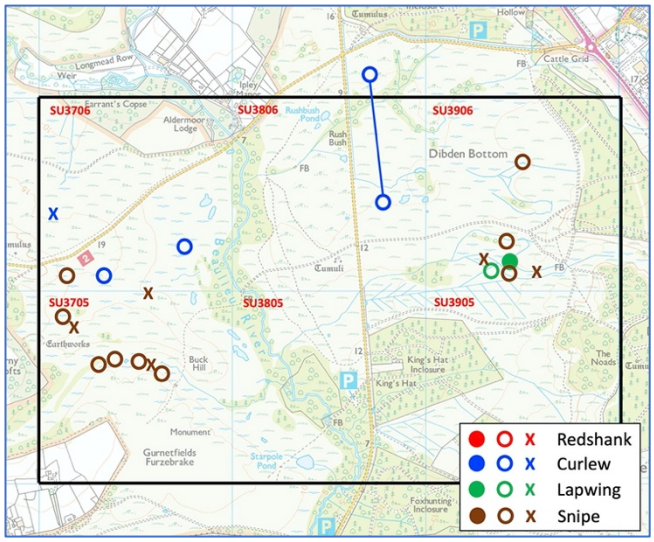

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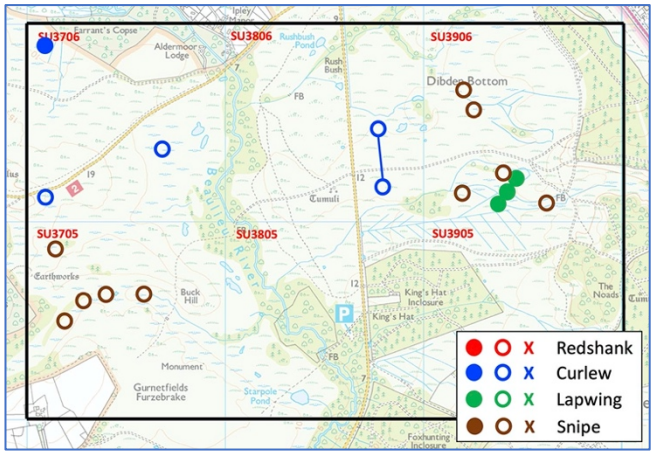

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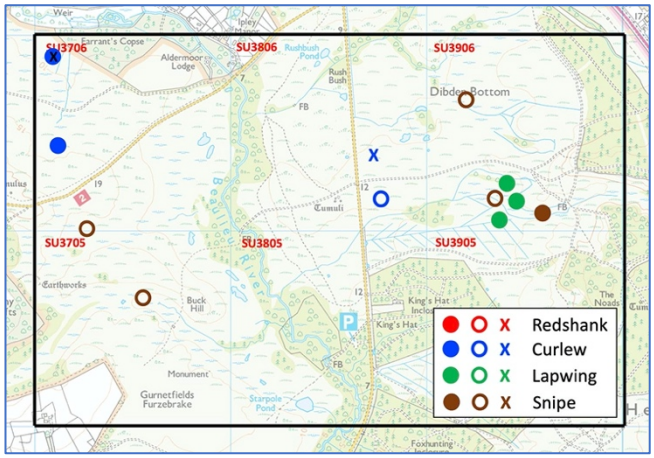

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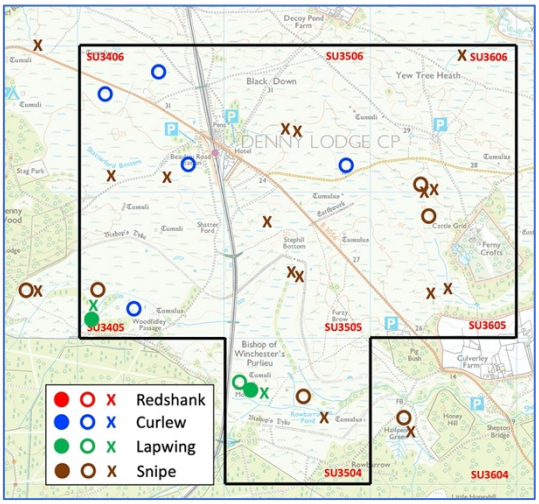

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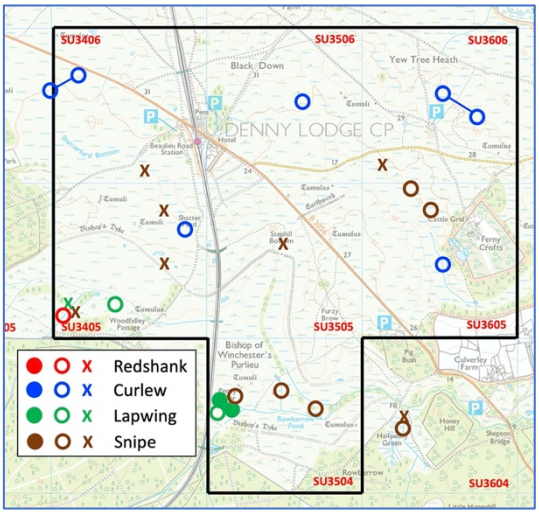

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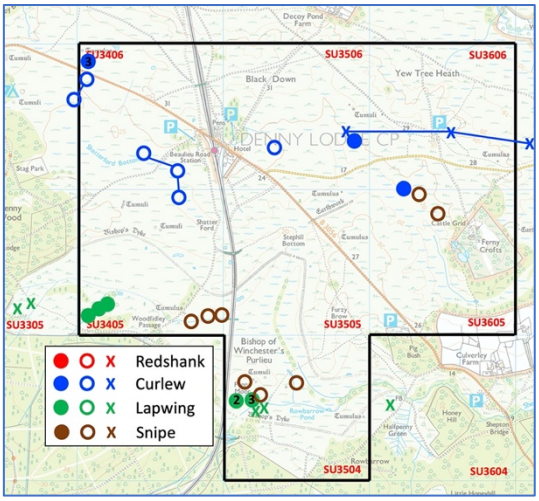

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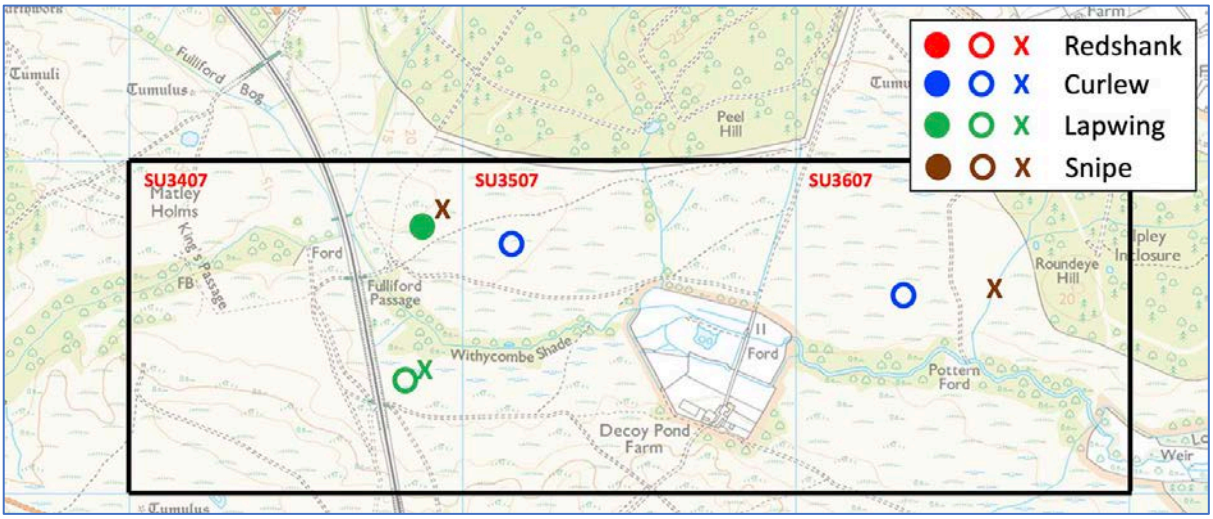

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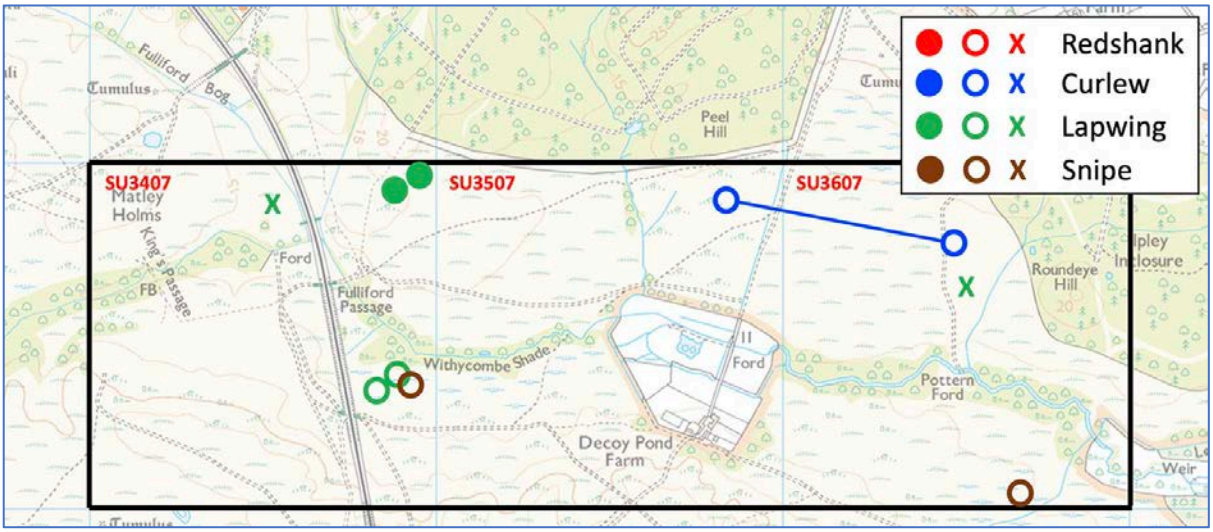

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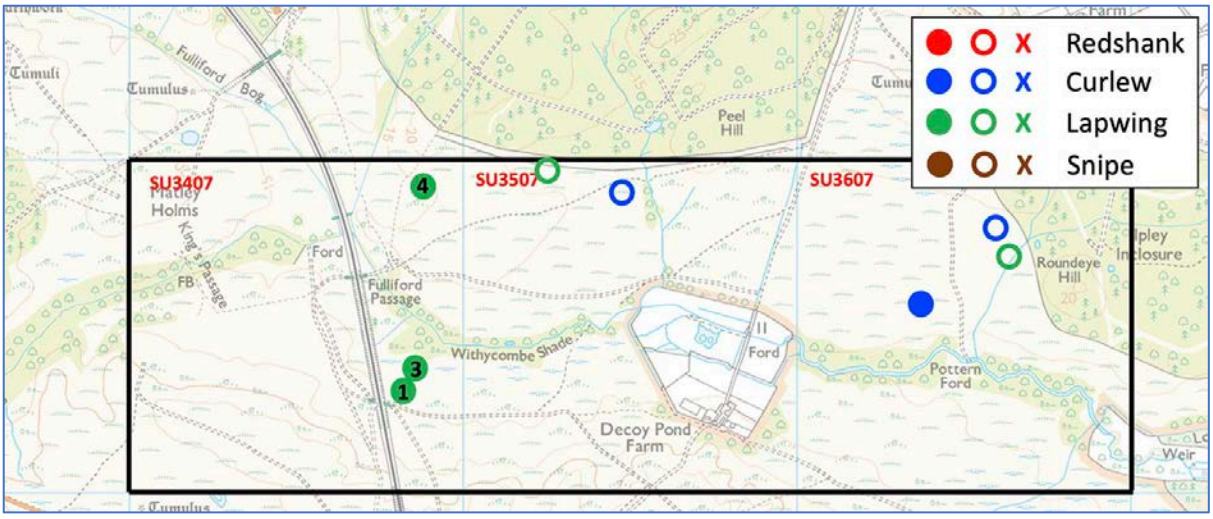

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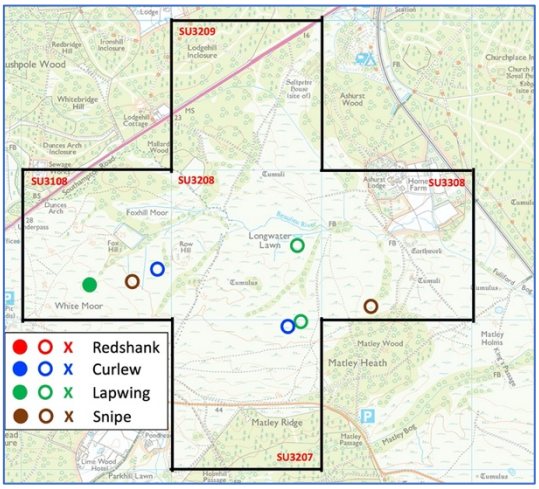

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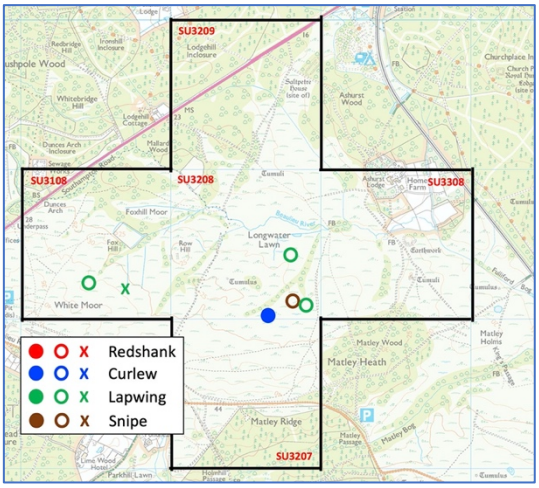

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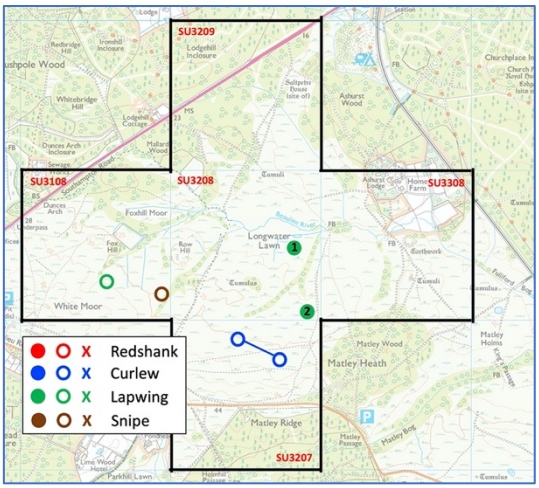

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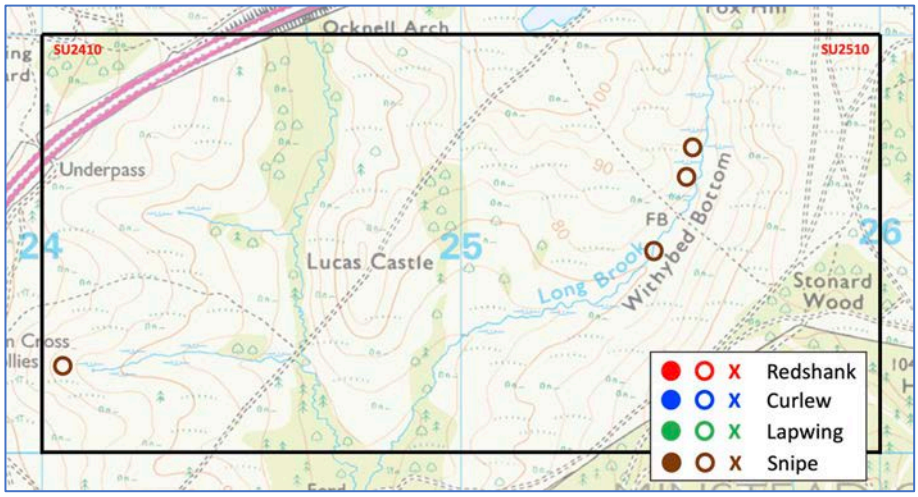

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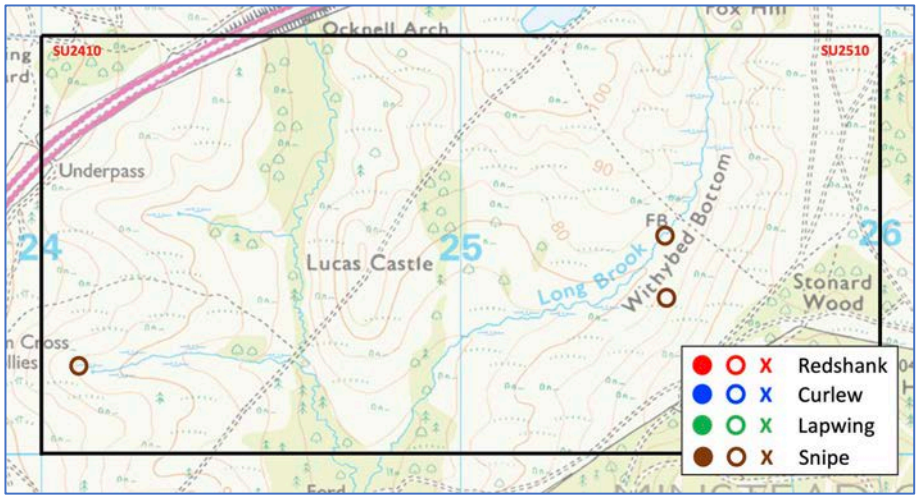

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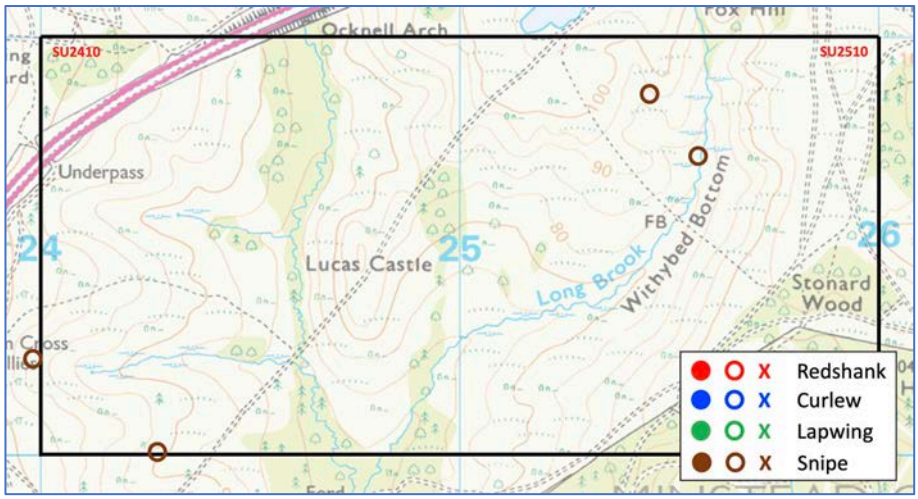

Appendix C: Risk assessment for fieldwork activities

Wild New Forest Risk Assessment (for survey and monitoring activities only)

Activity or operation: Ground-nesting bird survey		
Date of latest revision: 07/04/20	**Date of Activity/Operation:** 10/04/20 – 15/07/20	
Groups at risk: WNF Surveyors (Russell Wynn and Marcus Ward)		
Hazards	**Risk**	**Risk control measures**
Coronavirus (COVID-19)	Contracting or transmitting coronavirus (COVID-19)	All surveys to be undertaken by WNF Surveyors only (working independently); surveys will be focussed on wetland sites in the early morning and evening period, so direct contact with the public is unlikely, but during any encounters social distancing measures will be followed (e.g. maintaining >2m distance); avoid public transport and don't park in potentially busy areas; avoid touching gates etc (use gloves where this is unavoidable), and wash hands thoroughly upon arriving home; all survey briefings with FE staff to be undertaken remotely via phone, email or Skype
Lone working	Delay in receiving help if something goes wrong	Inform partner (at home) and other surveyor of survey location and timing, and sign in/out with other surveyor by text; all surveyors to carry mobile phone with sufficient charge
Travel to/from survey site	Injury or death	Utilise non-motorised, off-road transport (cycle, walk) where possible; if driving, adjust driving style according to conditions and possible presence of livestock on road; park away from hazards and avoid blocking gates or other access points
Falling branches/trees/ dead wood	Injury or death	Check weather conditions and avoid surveying under trees in strong winds; take care when walking in areas of fallen timber/brash
Livestock, e.g. ponies, cattle	Injury from animals, i.e. being kicked, trampled or charged	Be aware of livestock in survey area and avoid close approach, especially when foals/calves are present
Weather conditions	Adverse effect of weather on observers, e.g. heat stroke, sunburn, hypothermia	Monitor weather leading up to survey visits and check forecast immediately prior to commencement of survey; wear suitable clothing, use sun block, take sufficient food and

		water, and abandon survey if conditions become too adverse
Insects, animals and plants	Bites and stings, anaphylactic shock	Wear suitable clothing; do not approach potentially aggressive animals; carry treatment for known allergies; wear insect repellent in midge-prone areas
Contact with micro-organisms, harmful bacteria and pathogens	Contraction of disease e.g. Tetanus, Leptospirosis, Lyme Disease.	Ensure cuts, scratches and skin abrasions are thoroughly cleaned and covered with a waterproof plaster; for tick prevention – wear long sleeves and trousers, preferably with gaiters, check for ticks regularly, and do a full body check at end of survey day
Path furniture e.g. stiles, foot bridges, kissing gates	Cuts, trips, slips and falls	Take care when walking across, over or near these pathway features
Ponds, bogs and other water bodies on site	Risk of drowning or entrapment; particular risk if working near steep sided banks	Take particular care when working around water bodies and wet ground, especially when lone working; only cross these features at safe locations and avoid steep banks; do not enter permanently wet areas with standing water

Note that both named WNF Surveyors have previously received First Aid Training, but scheduled refresher training in spring 2020 has been postponed due to ongoing coronavirus restrictions.

Signed:

Prof Russell Wynn

Marcus Ward