



New Forest Breeding Waders 2019-2021

The Verderers of the New Forest
Higher Level Stewardship Agreement
AG00300016



Forestry England



**Department
for Environment
Food & Rural Affairs**



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CONTENTS

| | |
|---|-------|
| Executive Summary | 3-4 |
| Introduction | 5-6 |
| New Forest Designations | 5-6 |
| Map of HLS area and NFNPA boundary | 6 |
| Lapwing Ecology | 7 |
| Lapwing Photos | 8 |
| Lapwing Methods | 9 |
| Lapwing Results | 9-10 |
| Lapwing Evaluation and Conclusions | 10-11 |
| Curlew Ecology | 12 |
| Curlew Methods | 13 |
| Curlew Photos | 14 |
| Curlew Results | 15-16 |
| Curlew Evaluation and Conclusions | 16-17 |
| Curlew habitat and nest photos | 18 |
| Redshank Ecology | 19 |
| Redshank Methods | 19 |
| Redshank Photos | 20 |
| Redshank Results | 19-21 |
| Redshank Evaluation and Conclusions | 21 |
| Snipe Ecology | 22 |
| Snipe Methods..... | 22-23 |
| Snipe Results | 23-28 |
| Snipe Evaluations and Conclusions | 29 |
| Potential factors affecting NF waders | 30 |
| Additional wader data | 31 |
| References | 33-35 |

1. EXECUTIVE SUMMARY

- a. Hampshire Ornithological Society (HOS) was commissioned after tender in February 2019 by the then Forestry Commission, but now Forestry England, on behalf of its partners within the Verderers of the New Forest Higher Level Stewardship scheme (HLS) to undertake a survey of breeding waders on land covered by the Verderers of the New Forest and National Trust HLS schemes, ie the whole of the New Forest Common land, and land under the management of the National Trust, Hampshire County Council and Wellow Parish Council, (see map page 6).
- b. Volunteers with experience in the calls and identification of Lapwing, Curlew, Snipe and Redshank were sought from within HOS's 2000 members. It was agreed that Lapwing, Curlew and Redshank would be surveyed during 2019 and that Snipe would be covered during 2020 due to the volunteer effort required and to ensure maximum effort could be targeted at Snipe which are more difficult to survey.
- c. The totally unforeseen Covid 19 pandemic unfortunately saw fieldwork for Snipe suspended through 2020 but targeted Snipe survey work was commissioned for two local field workers within the government's conditions for permitted access to the countryside during the pandemic restrictions. HOS completed the fieldwork during 2021 by covering all the 1km squares not surveyed in 2020, while a sample of the 2020 survey work was repeated for comparison.
- d. All 1km squares containing suitable wader habitat were surveyed using the standard BTO methodology used in previous surveys, except that in the case of Snipe suitable areas were walked to within 50 metres rather than 100 metres with the agreement of Natural England. This was hoped to give a slightly more accurate census, since Snipe will often only flush at close quarters.
- e. Upon completion of the fieldwork the data was analysed to determine the number of breeding pairs present. This produced a breeding population estimate of 68 Lapwing territories, 40 Curlew territories and 7 Redshank territories within the areas surveyed in 2019, and a breeding population estimate of 181 territories/pairs for Snipe covered in 2020 and 2021.
- f. Comparisons with previous surveys in 2014, 2004 and 1994 indicate that the breeding populations of Curlew and Lapwing have declined sharply in recent years. However, the authors have serious doubts around the efficacy of the 2014 Curlew data and concerted targeted fieldwork by a small group under the auspices of "Wild New Forest" over the intervening years have shown a much reduced but stable population of around 40-45 pairs/occupied territories which is commensurate with the 2019 data gathered and feel that this is the truer figure that should have come from the 2014 survey. That said, the 2019 breeding population of Lapwing and Curlew within the New Forest appear to be declining and robust regular monitoring is desirable to tease out normal population fluctuations from more insidious long-term declines. Comparisons with previous surveys in 2014, 2004 and 1994 indicate that the breeding populations of Snipe remain relatively stable given the challenges of surveying for this species.

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- g. This report provides a comprehensive assessment of the current breeding population of Lapwing, Curlew, Redshank and Snipe in the New Forest and evaluates the important factors to guide future surveys. It also explores factors affecting the breeding population and distribution of wader species within the New Forest.
 - h. The additional data provided on Page 31 provide further proof that the 2019 survey figures for Curlew and subsequent evaluation were accurate and that the current population is stable around 40-45 territories. Although less rigorous than the Curlew data it has also shown that Lapwing and Redshank numbers have not responded positively given the wetter spring conditions and adds weight to the stated concerns for these species.

2. INTRODUCTION

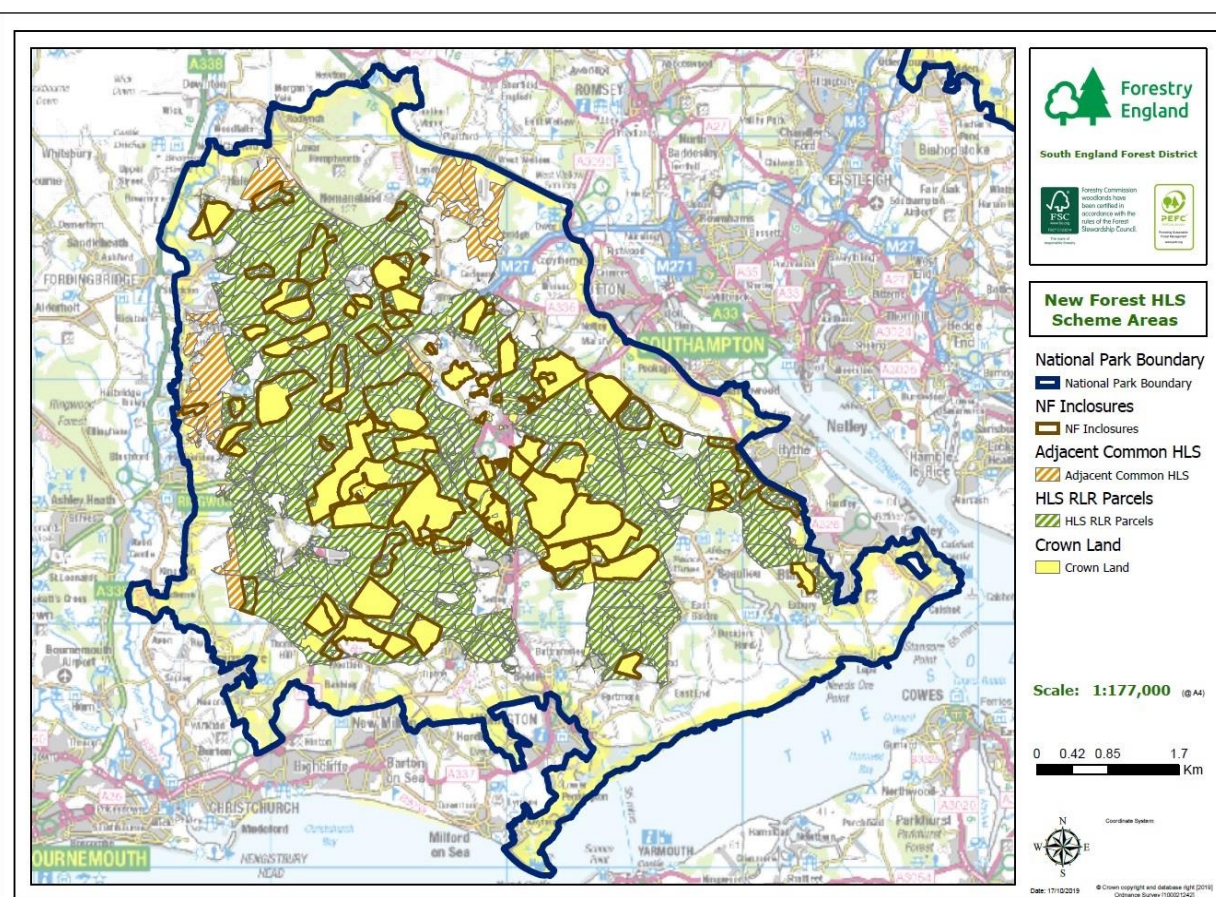
- a. A ten-year Higher Level Stewardship Scheme (HLS) was awarded to the Verderers of the New Forest in 2010 in partnership with Forestry England and the New Forest National Park Authority. The scheme is granted by the Department for Environment, Food and Rural Affairs (Defra) from the EU's Rural Development Fund for England and administered by Natural England. In the case of the New Forest, whilst the Crown Lands are managed by Forestry England (FE), the Verderers have statutory rights conferred under the New Forest Acts to administer the grazing and commoning rights and are legally and financially responsible for the delivery of the scheme. The delivery of works funded under HLS is overseen by a Board from the chief executives of the Partners and representatives from key stakeholders.
- b. As part of the Verderers of the New Forest HLS agreement there is a requirement to undertake surveys for bird species for which the New Forest SPA is designated. The HLS Board agreed the requirement for delivery of a survey of breeding waders in 2019 in accordance with the 1 km square methodology.
- c. Following successful tender, Hampshire Ornithological Society (HOS) was commissioned by the Forestry Commission (now Forestry England) to undertake a survey of breeding Lapwing, Curlew and Redshank on behalf of its partners within the Verderers of the New Forest HLS scheme, on land covered by the Verderers of the New Forest HLS, and including land managed by the National Trust and Hampshire County Council and Wellow Parish Council on the understanding that Snipe would be covered in 2020 to enable a full commitment to this more difficult of the wader species to survey.
- d. This report provides an account of the methods used to determine the range and density of breeding waders within the New Forest and evaluates the findings of the surveys. It also provides an analysis of the survey information including the status of the population compared to previous local studies and explores the potential factors which may be affecting the distribution of waders within the study area and more importantly factors affecting breeding success.

New Forest Designations

- a. The New Forest has long been considered one of England's most important and extensive semi-natural landscapes having received protection through its designation as a royal hunting forest since the 11th Century. It comprises internationally important wet and dry heathlands, valley mires, grasslands, ancient pasture and woodland and boasts both national and international wildlife site designations. It is classified as a Special Protection Area (SPA) for its breeding and overwintering bird species of European importance, in accordance with the European Birds Directive (Directive 2009/147/EC on the conservation of wild birds [codified version]).
- b. In 2005 it was also designated a Special Area of Conservation (SAC) for thirteen Annex 1 habitats and three non-avian species of European importance, the Stag beetle (*Lucanus cervus*) Southern damselfly (*Coenagrion mercuriale*) and Great Crested newt (*Triturus cristatus*) in accordance with the European Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora). The European Directive requirements, ensuring the protection of European wildlife sites, are transposed into UK law by the Conservation of Habitats and Species Regulations 2017 (as amended).

- c. The New Forest Site of Special Scientific Interest (SSSI) covers nearly 29,000 hectares following a revision of boundaries in 1996 and is the national designation that recognises the biodiversity value of the New Forest.
- d. The New Forest is also listed as a Ramsar site, under the Ramsar Convention for its importance as a wetland of international importance.

Verderers of the New Forest HLS area (green) including National Trust Commons and Hampshire County and Wellow Parish council (orange) within the National Park boundary (blue)



3. LAPWING

Lapwing Ecology

- a. Formerly a common bird of farmland, marsh, water meadow and heath the Lapwing has been declining for decades due to changes in agriculture and is now absent from much of this landscape. The Hampshire Bird Atlas 2007 - 2012 illustrates a near 50% reduction in tetrads holding Lapwing compared to the 1986-91 Atlas. Even on the New Forest heaths it continues to decline to the extent that two thirds of the whole Forest population today was to be found in just one 190-hectare site on Beaulieu airfield in the 1970s (R.& J. Jackson 1972 -78).
- b. Lapwings breed early in the year staking out their territories in March and are usually sitting their usual clutch of four eggs by early April. They need a mosaic of short or grazed sward with clumps of taller vegetation or broken disturbed ground such as is found on water meadows, grazing marsh or the New Forest heaths and mires. The water table is important to this species to enable access to the abundant insect and invertebrate prey needed by the young. The short sward enables the chicks and adults to move freely around the habitat and the clumps and broken ground provide cover for the sitting bird and small young when predators are around.
- c. As with most species their requirements for success are not straightforward. Studies undertaken on the Forest in the 1970s (R&J Jackson 1971-78) found that up to the hatching stage wet seasons appeared beneficial to Lapwing, resulting in shorter than average laying date spreads, low predation, and the creation of the best feeding conditions for newly hatched chicks. However, once the eggs had hatched then wettest conditions produced the highest mortality and below average rainfall the least.
- d. Lapwings are very susceptible to periods of snow or very cold conditions and where this coincides with their arrival on the breeding grounds can quickly lead to high mortality. Birds that fail in their first laying attempt will relay and while some will try in the same general area, others will move in the hope of finding a more suitable site. This is where double counting of the population can occur if the survey period is too long.

Adult Lapwing



Newly hatched Lapwing chicks



Lapwing Methods

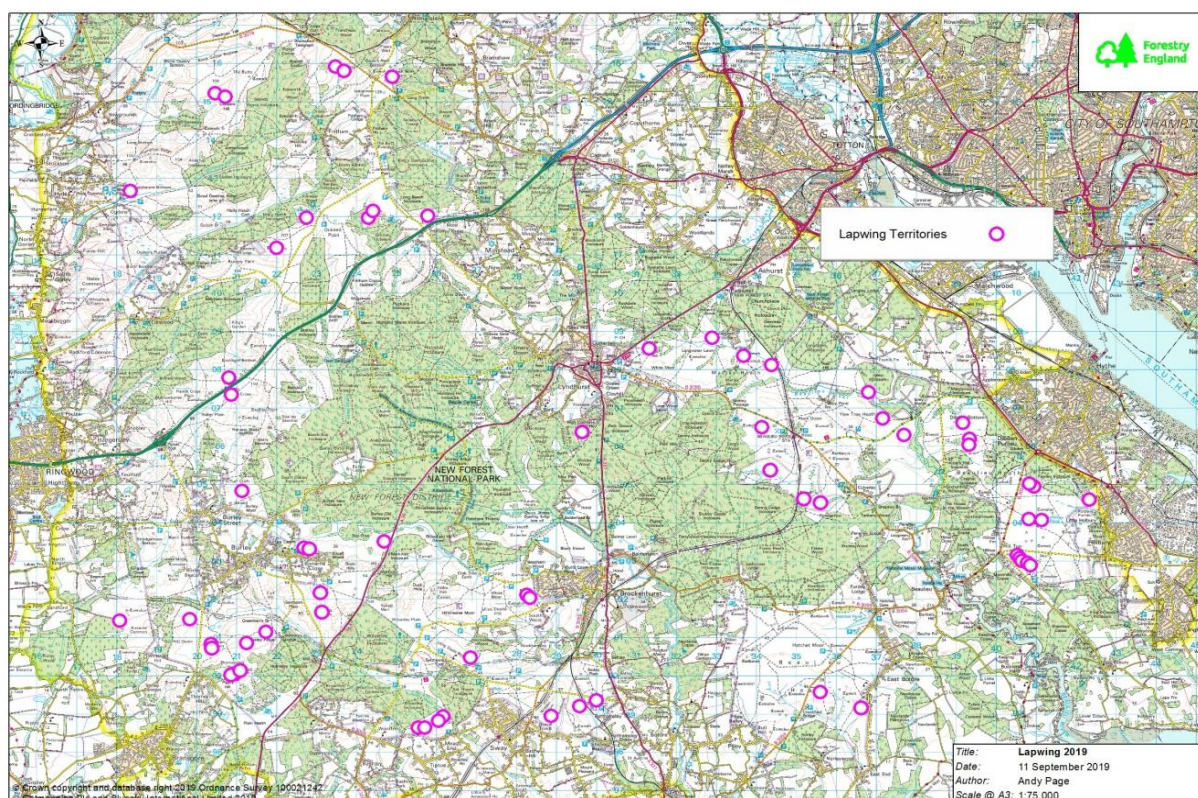
- a. The 2019 survey for breeding Lapwing covered all 1km squares of the Crown Lands and adjacent commons covered by the Verderers of the New Forest HLS agreement and adjacent HCC National Trust and Wellow Parish Council commons, containing habitat with the potential to support breeding Lapwings. Coverage was achieved in conjunction with surveyors engaged in the Forest wide Woodlark survey and additional surveyors targeting those squares not covered by the Woodlark survey. Some areas received further visits by experienced fieldworkers with considerable knowledge of recent Lapwing territories to determine breeding and therefore enable more accurate analysis of the core 2019 data at the end of the survey period.
- b. This survey followed the standard BTO methodology of three visits to each of the survey units. The visits were to be undertaken between the 10th of April and the 22nd of June 2019, with at least two weeks between visits to a survey unit and carried out between the following dates, visit one; 10th April 2019 – 30th April 2019, visit two; 1st May 2019 – 21st May and visit three 22nd May -22nd June 2019.
- c. While the recording methods are the same as those used in previous surveys, the 2019 survey covered all 1km squares and did not sample or extrapolate, therefore leading to a more comprehensive survey. The 1994 (Tubbs & Tubbs) and 2004 (Goater) population estimates relied on extrapolation where sampling was based on random squares containing a minimum of 15 hectares of wet heath/bog habitat. The 2014 survey followed the same habitat types identified in the previous two surveys and considered suitable for breeding waders. Survey units of approximately 150 hectares were then mapped and a suitable transect route determined to allow all suitable habitat to be approached within 100 metres.
- d. It soon became apparent to the 2019 surveyors that Lapwing numbers were so low that a small number of the most experienced fieldworkers were able to re-survey some of the most productive Lapwing sites to gather additional data on nesting success.
- e. The locations of all Lapwings were recorded, with special attention given to those showing territorial behaviour such as displaying or alarm calling, and simultaneously displaying males.
- f. The standard methodologies while comparable with previous surveys carry some inherent risks that could lead to over counting but this anomaly is considerably reduced when population levels are low as has been proven this year. Nevertheless, they should in our opinion still be considered for future surveys. Where possible we should aim for the most accurate census of numbers as possible, and we are confident that we have proved that this year.

Lapwing Results

- a. Numbers of birds across the Forest were sufficiently low to enable systematic follow up and accurate counting of pairs and individuals. No individual site held more than five pairs of breeding Lapwing so plotting and accuracy were easily obtained. It was assumed that all pairs would attempt breeding and unmated males were at the least acting territorially. A territory centre point was then allocated to each of these sightings based on the location of a sitting female or the attendant male or the centre point of displaying bird registrations considered to represent this territory.

- b. It is assumed that all territorial pairs will have attempted or been successful in a breeding attempt. Many will have been predated with eggs or young and some will have moved to new locations for further breeding attempts. It is therefore important that the survey period is sufficiently targeted to ensure relocating failed breeders are not counted as additional or new pairs.
- c. The breeding population is the number of pairs present based on the recording of territorial males, pairs, or birds standing guard near nests or incubating birds.
- d. The 2019 total of 68 pairs is the lowest recorded for the New Forest area.

Map showing Lapwing territories



Lapwing Evaluation and Conclusions

- a. Comparison with past surveys is not easy and does little to inform the layman and those looking for accurate data to compare with recent studies. The 1994 and 2004 surveys were based on extrapolation from sampled squares of key habitat. Although an approved methodology it carries a few inherent pitfalls that require deeper understanding. For reasons unknown Lapwings are completely absent from some large mire complexes of seemingly suitable habitat,

yet found in small marginal habitat that would not have been included in the random samples. Where resources allow, a full 1km survey of all habitats should be the preferred survey method.

- b. Previous studies (R&J Jackson 1971-78) have proven that drier and warmer spring weather, likely to be a factor of global warming, renders areas of the Forest less suitable for breeding and leads to increased disturbance from the visiting public particularly around the Easter period. This was the case in 2019 and could have been a contributing factor to the poor population figures derived.
- c. Notwithstanding the slightly different monitoring techniques of previous surveys, the 2004 Lapwing figure of 117 pairs indicated an increase of around 35% on the 1994 figure of 85 pairs. The 2014 survey figure of 144 pairs of breeding Lapwing indicated a further 23% increase in the Lapwing population.
- d. The 2019 figure of 68 pairs indicates a 52% decline in the population over 5 years equating to an annual reduction of 13%. They are not however that dissimilar from the extrapolated population of 85 derived from the 1994 survey. Whatever the true figures were historically it is quite clear if the previous survey figures are to be believed then at current losses the Lapwing could be almost gone from the Forest as a breeding species within 10 years. However, we have already recognised that the very dry spring was not conducive to good Lapwing breeding conditions and highlights the need for regular long-term monitoring to iron out these natural peaks and troughs. Unfortunately, we do not have any national figures for Lapwing in 2019 to enlighten or support our New Forest results but we do know that numbers in the adjacent Avon valley were better than in previous years (GWCT). It is not inconceivable that Lapwing numbers will take a turn for the better should spring conditions in the Forest improve next year.
- e. It has become evident in recent years that fledging success is very low with high levels of predation. Alongside the perceived effects of global warming, driving a wider decline in wader numbers across southern Britain, the decline in Lapwings on farmland and increasing public pressure on somewhere as heavily visited as the New Forest it is probably not surprising that the population of Lapwing is in a precarious position. It is vital that regular ongoing monitoring of this species continues, to assess longer term declines.
- f. No work has been done on whether trampling of nests by commoning stock occurs and if it does, what effect it might be having on wader productivity, plus what, if any, are the positive or negative correlations between stock numbers and breeding waders. Grazing undoubtedly creates suitable chick foraging habitat and invertebrate life would be associated with the dung from these large herbivores, however concentrations of stock particularly around winter feed areas attract large numbers of corvids which are predators of eggs and chicks.
- g. In conclusion it is likely that predation is a major factor accelerating the declines alongside climate change. However, the Lapwing's liking for the short cropped wet lawns brings them into regular contact with the increasing public pressure and recreational use of the Forest which in turn has excluded them from much suitable breeding habitat such as that at Balmer Lawn adjacent to the Hollands Wood campsite.

4. CURLEW

Curlew Ecology

- a. The UK holds more than a third of the global breeding population of Curlews. However, the species UK breeding numbers have undergone a dramatic decline of 43% in the population from 1995 – 2012. The decline has been most marked in Ireland where a massive 78% of the population has been lost and this has led to it being Red listed as a bird of the highest conservation concern. In Hampshire the main breeding population is still to be found in the New Forest but no longer in the adjacent Avon valley.
- b. Traditionally thought of as a bird of wide-open spaces such as moors and heaths it is closely associated with estuary habitat where it spends the winter and often nests in grass fields or, where they remain, traditional hay meadows. Modern farming practices, changes in land use and disturbance and predation are all probable factors in the decline of this evocative species.
- c. The British Trust for Ornithology (BTO) has recently documented how a range of pressures are likely to be the causes of these contractions (Dr Samantha Franks). Researchers analysed long term monitoring data, collected by thousands of volunteer birders from across the country as part of the Breeding Bird Survey (BBS). They identified three main areas, habitat loss and degradation; the presence of predators such as foxes and crows; and climate change.
- d. Curlews breed at highest densities in areas of semi-natural grassland and on moorland and are particularly associated with the uplands. The BTO study found that the declines have been greatest where these habitats have been afforested, and where populations of generalist predators are high. Being ground-nesters, this probably reflects the vulnerability of the nests and chicks to predation. The species also seemed to have declined more in warmer, drier areas, potentially through impacts on their invertebrate food due to climate change.
- e. Birds begin to return from their wintering grounds to the breeding sites from mid- February, but birds will readily move between the two until the onset of egg laying around late April and the first week of May. The nest is very exposed in open habitat where the sitting bird can see approaching danger. The normal clutch is 4 eggs incubated by both sexes for 28 – 30 days. Repeat clutches are possible if predation occurs early in incubation but the birds are generally single brooded. Fledging takes 5 - 6 weeks.

Curlew Methods

- a. All 1km squares of the Crown Lands and adjacent commons covered by the Verderers of the New Forest HLS agreement containing habitat with the potential to support breeding Curlew were surveyed. While the recording methods are the same as those used in previous surveys, the 2019 survey covered all 1km squares and did not sample or extrapolate, therefore leading to a more comprehensive survey. The 1994 (Tubbs & Tubbs) and (2004 Goater) population estimates relied on extrapolation from sampling based on squares containing a minimum of 15 hectares of wet heath/bog vegetation. The 2014 survey followed the habitat types identified and considered suitable for breeding waders identified in the previous surveys and then survey units of approximately 150 hectares were mapped and a suitable transect route determined to allow all suitable habitat to be approached within 100 metres.
- b. The 2019 survey followed the standard BTO methodology of three visits to each of the survey units. These were undertaken between the 10th of April and the 22nd of June 2019, with at least two weeks between visits to a survey unit. Visit one: 10th April -30th April, visit two: 1st May -21st May and visit three: 22nd May -22nd June.
- c. The 2019 survey for breeding Curlews also used the most up to date information from intensive survey work carried out from 2016 to 2018 by local ornithologists and co-ordinated under the Wild New Forest group (Wynn, Page, et al 2019).
- d. The locations of all Curlew sightings were recorded, with special attention given to those showing territorial behaviour, calling and in particular simultaneously displaying males. All observations of calling birds (both males and females) or birds seen flying were also recorded. A territory centre point was then allocated to each territory based on the registrations or the location of an active nest. The breeding population is the number of pairs present.
- e. Throughout the survey period additional input was given to establishing the true extent of breeding territories by some nest finding aided by information gained from the last three years intensive survey work where breeding territories and nest data were gathered for over 40 nests.
- f. Given that the remit of the survey was to cover all 1km squares of suitable habitat present within the Verderers of the New Forest HLS agreement and adjacent land managed by the National Trust, Hampshire County Council and Wellow Parish Council area and the wealth of up to-date local information available on this species it was not felt necessary to apply any analysis technique or sampling protocol as in previous surveys.
- g. The 2014 survey considered displaying / calling individuals to be different registrations if they were a significant distance apart. What this distance equated to was not disclosed but would presumably be greater than the two separate instance of different Curlew nests found only a couple of hundred metres apart this year. This detailed knowledge plus that already gained from previous years will lead to a more accurate appraisal of territories and ultimately the population.

Adult Curlew



Curlew nest and eggs



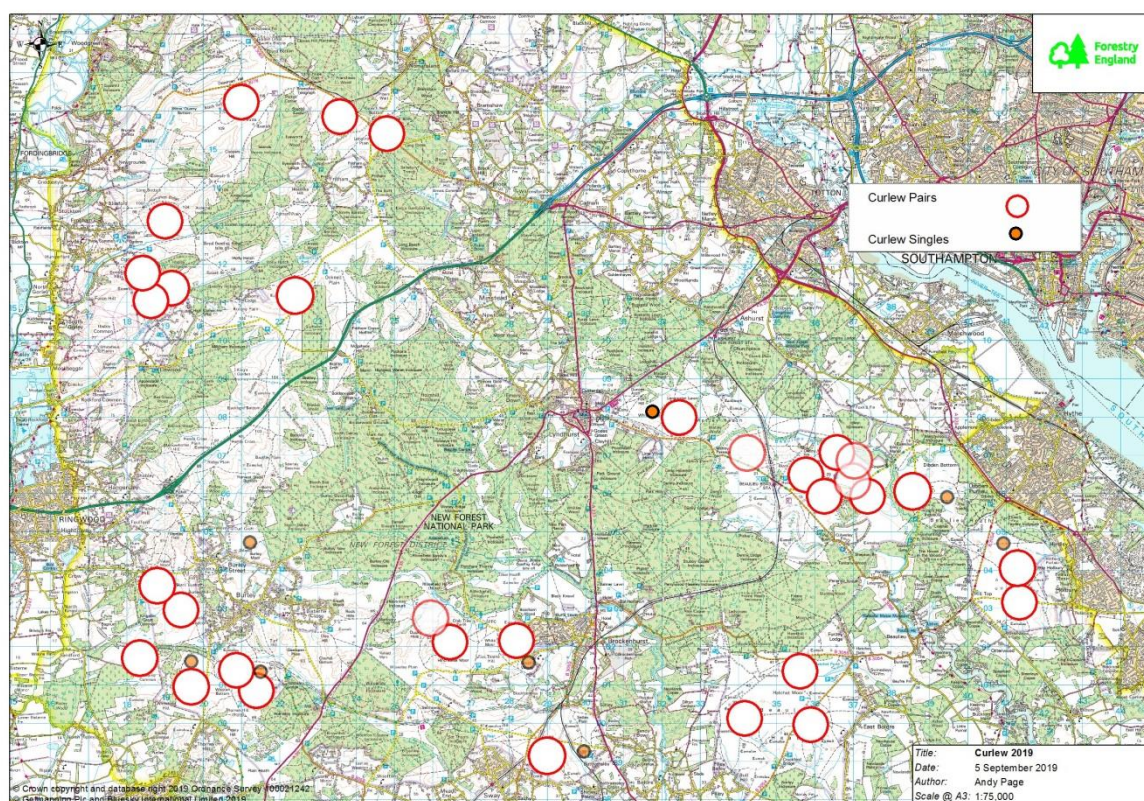
Curlew Results

- a. A maximum of 40 potential territories were found, however we could not positively determine the precise understanding of 5 potential sites where birds were recorded on a number of occasions but where disturbance or other factors was significant enough that no activity indicative of attempted breeding could be established.
- b. The standard BTO methodologies while comparable with previous surveys carry some inherent risks that could undoubtedly lead to over counting and in our opinion should be seriously considered for future surveys. Recording sightings of such a mobile species as Curlew without attempting to hone down to breeding territories can lead to over counting. The more intimate knowledge gained from the nest monitoring and tagging work recently undertaken has in our opinion led to a more accurate appraisal of the state of Curlews in the New Forest in the last three years. Populations of Curlew are at low enough levels that we should aim for the most accurate census of their numbers as possible.
- c. For such a wide-ranging species as Curlew, over recording is always possible during surveys employing these set visits over a set time. It is unfortunate that the 2014 survey results may have been skewed by this factor, as experienced local field workers, immediately doubted the efficacy of the 111 pairs reported in 2014 and from this concern, emanated the intensive local WNF study for the period 2016 – 2019. The results of which (see table on page 16) has proven them correct unless the population has more than halved in the year between the 2014 survey and the first full year of the WNF survey in 2016. However, the population stability shown in the last three years would question this theory.
- d. Some Curlews that fail early in incubation undoubtedly try to nest again and repeat clutches have been found in previous years. Some sites have such high disturbance or predator pressure that no breeding activity is noted although it would almost certainly be attempted in most instances. Some registrations at first visit cannot be found in subsequent ones and this is where analysis becomes difficult. Do these birds displace to other areas or are they overlooked, as mates are intent on incubation and vocal activity drops considerably? A surveyor quietly moving through a territory of the breeding pair is often necessary to prove occupation as prolonged watching is only productive if a passing threat such as Raven or Buzzard invokes a territorial defence by the off-duty bird. However, even this is not always enough as the sitting bird will allow extremely close approach without flushing.
- e. As previously stated, we have drawn heavily on the additional information supplied by workers studying the New Forest Curlew since 2016 to give the fullest possible picture for the current population status of this species and the results of the combined survey effort from 2016, 2017 and 2018 coupled with this official 2019 survey are tabled below.

| | 2016 | 2017 | 2018 | 2019 |
|---|------|------|------------------|------|
| Probable no. of territories/ pairs or singles | 40 | 40 | 41 | 40 |
| Nests found | 19 | 7 | 26 (inc 1 relay) | 12 |

- f. The 2019 survey recorded 40 occupied territories on land within the Verderers of the New Forest HLS agreement area and adjacent HCC, National Trust and Wellow Parish Council commons. The location of all Curlew territories recorded during the survey of breeding Waders in 2019 is provided below.

Map showing Curlew territories



Curlew Evaluation and Conclusions

- a. Throughout most of the UK the Curlew has undergone a recent and dramatic population crash and is now absent from many of its former haunts. This has catapulted the species to the dubious status of highest conservation priority. The New Forest still holds the largest southerly population but even here numbers have declined substantially.
- b. A concerted New Forest survey effort over the period 2016 -2019 (Wynn, Ward, Page et al) has shown a smaller but relatively stable population of around 40 pairs. Work has been undertaken to try and determine hatching success and some of the factors responsible for failures. Temperature data loggers have been placed in nests to try and assess whether disturbance from people was keeping birds from nests and at what stages of incubation and day or night that predation was occurring.

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- c. During 2018 twenty-six Curlew nests were found equating to two thirds of the known territories. Twenty-two nests contained 4 eggs. Results so far show that around 50% of nests are predated at incubation with one instance of a female being predated on the nest, presumably by a fox. (Wynn, Page, et al 2019) As Curlew are relatively long-lived birds, even at these high predation levels the population could sustain itself providing some chicks were reaching adulthood.
 - d. Proving fledging is however the most difficult part of the monitoring and although hatching occurs at several nests, many are lost in the first couple of weeks. 2019 was the first year of the four that confirmed fledging was reported and from three locations. It should be noted that observer effort in this area has been limited but, coupled with the egg predation data, it is clear that egg and chick predation is an important factor to be addressed if we want to continue seeing the Curlew as a breeding species of our lowland heaths.
 - e. Efforts to reduce casual disturbance of nesting Curlews from forest users and dogs coupled with the seasonal closure of a few key car parks and improved control of ad-hoc verge parking are all methods that have helped mitigate against some of the factors affecting nesting Curlew. Concerted awareness campaigns, Ranger effort and co-operation from user groups such as Duke of Edinburgh participants, have all been positive steps in efforts to give the species the best chance of recovery. In fact, 2019 was the first year of the last three that Curlew chicks were known to have reached the flying stage on the Forest.
 - f. Three New Forest Curlews are currently satellite tagged to try and identify key wintering areas and identify those feeding fields adjacent to the Forest that are important to the New Forest breeding population. Tracked birds from 2018 were making regular forays to feeding grounds around Lymington from their nesting site near Brockenhurst, and to pasture fields in the Avon valley from a breeding site near Burley. Birds that failed in their breeding attempt soon vacated the Forest and moved to Poole harbour or the Solent for assumed post breeding or wintering feed areas. (P.Potts and A.Hoodless unpublished).

Curlew nest and eggs in mire habitat



Curlew nest in humid heath



5. REDSHANK

Redshank Ecology

- a. Redshanks are a medium sized wader of coastal marshes and meadows and bogs and mires on lowland heath. Formerly a widespread breeder of the Avon and Test valleys the Redshank has declined steadily in numbers over the decades. This decline was already evident by the time of the 1986-91 Atlas and by the time of the 2007 -12 Hampshire Atlas had been lost from a further 78% of tetrads within Hampshire.
- b. The Redshank nest can be open in short heathland vegetation or deep inside a grass tussock where the growing vegetation is formed into a tent like canopy over the sitting bird. It lays 4 eggs from mid -April to May and is single brooded. Both sexes take turns at incubation which lasts for 24-26 days. Redshanks are extremely noisy and demonstrative when on their breeding territory and unlikely to be missed by surveyors.

New Forest population trends

- a. Tubbs (The New Forest; revised 2001) cites a breeding population of 60 pairs in 1960 and 105-140 pairs in 1981 but is not clear on how these figures were arrived at, just that they lacked scientific rigour. There is also no information on their distribution across the Forest. By the time of his 1994 sample survey 18 pairs had been recorded extrapolated to a Forest population of 54 pairs. Whatever the true figures were, they were obviously higher than they are today.

Redshank Methods

- a. All 1km squares of the Crown Lands and adjacent commons covered by the Verderers of the New Forest HLS agreement and adjacent land managed by the National Trust, Hampshire County Council and Wellow Parish Council containing habitat with the potential to support breeding Redshank were surveyed. The survey for Redshank followed the same standard BTO methodology of three visits to each of the 1km squares as for Lapwing and Curlew with this species being recorded while surveyors were covering the Verderers of the New Forest HLS survey area for the other wader species.

Redshank Results

- a. The survey results show the continued tenuous hold this species has as a breeding wader of the New Forest. While it has never been abundant it has been lost from the North of the Forest in recent decades which is probably a reflection on the wader losses that have occurred in the nearby Avon valley. The species is however still clinging on in the SE of the Forest where it is found within the proximity of the tidal estuaries of Beaulieu and Southampton Water where birds would presumably be found in winter. This year's survey showed no additional records or recolonization of former sites.

Adult Redshank

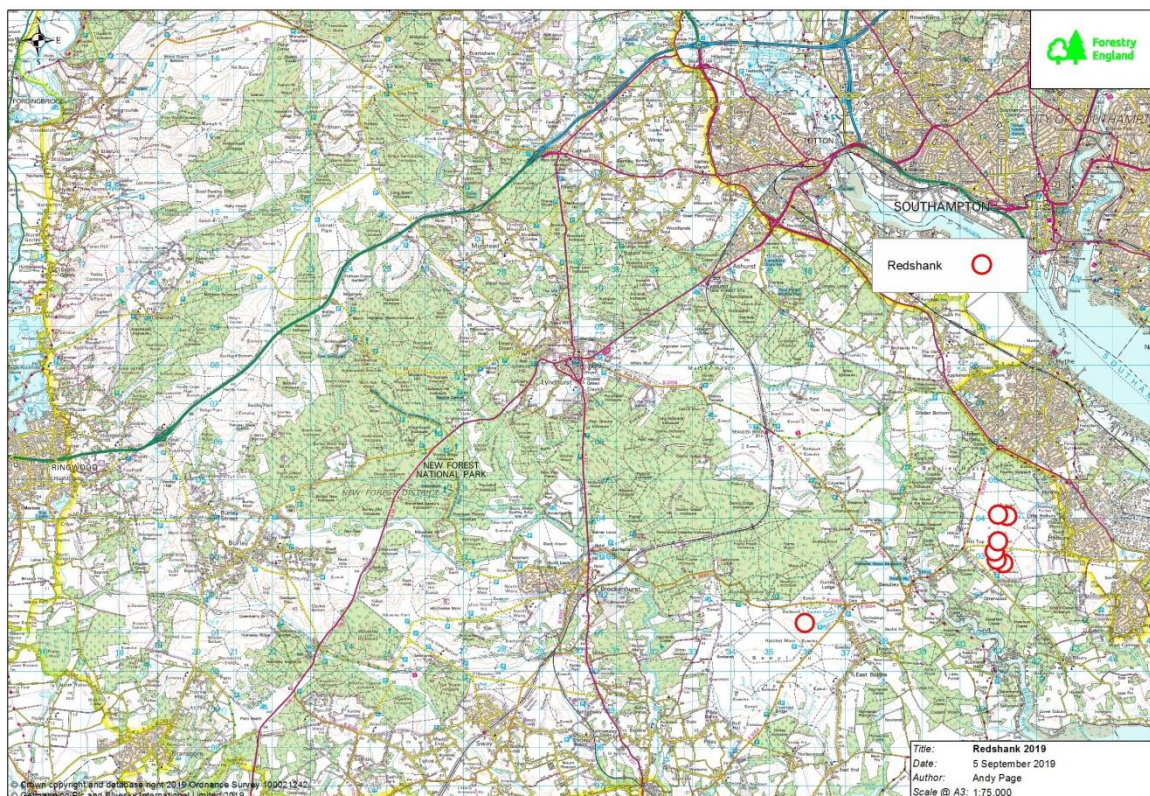


Redshank nest and eggs on a New Forest mire



- b. The map shows that there are just seven locations where Redshank were recorded during the survey period of 2019. The 2014 survey (RPS), recorded thirteen breeding pairs, indicating numbers have declined even further. Of the two main highlighted areas for the species in 2014 (Bagshot Moor and Stonyford) only the latter held comparable numbers with just a single registration at Hatchet representing the Bagshot Moor complex.

Map showing Redshank territories



Redshank Evaluation and Conclusions

- a. There is little to evaluate, and the only conclusion is that Redshank are in danger of being lost as a breeding species from the New Forest. No successful hatching or fledging has been recorded recently and this will undoubtedly be contributing to the decline if there is no recruitment to the local breeding population. The effects of predation, on this and the other New Forest wader species is not fully understood alongside the other environmental and recreational pressures they are subjected to and there is considerable concern that we are in danger of losing this unique suite of wading birds from the New Forest given the recent population declines. There is still much to research in teasing out the effects of climate change, predation, grazing stock numbers and human recreational pressure, in relation to these and other key species, but regular yearly monitoring would be desirable.

6. SNIPE

Snipe Ecology

- a. The Snipe is a secretive small wader of just 25-27 cm. It was once widespread and fairly numerous across much of the UK and inhabits damp marshy places such as moorland, mosses, bogs, water meadows and sometimes quite dry heather and moor. It has suffered badly in the last century due to agricultural intensification and drainage. Despite this it remains on the legal quarry list for game shooters in the UK.
- b. Snipe, are a highly migratory species with the UK receiving a large influx of birds from Northern Europe each winter, depending on the severity of temperatures and rainfall. Their cryptic plumage and secretive behaviour mean they are inevitably under recorded both in distribution and abundance.
- c. The Hampshire Bird Atlas 2007-2012 documents the continuing and dramatic decline of the Snipe as a Hampshire breeding species over the two decades since the previous Atlas. There has been a 75% contraction in range across Hampshire and it has been lost as a breeding species from the Test and Itchen river-valleys and was recorded as breeding in only one tetrad in the Avon valley, a former stronghold for the species. Even in the New Forest the HBA only recorded breeding as likely in 22 tetrads, but the methodology was not favourable to finding crepuscular species such as Snipe. Had the Atlas been carried out using our 2020-21 data it would have recorded breeding as likely in 33 tetrads.
- d. Snipe generally lay 4 heavily marked and cryptically coloured eggs in a nest cup lined with grasses on top of a clump, hummock, or tussock of rough herbage. The incubating bird sits extremely tightly, and eggs hatch after around 19 days. After hatching the cock and hen may divide the family with each taking two chicks to look after. Young Snipe flutter strongly at 14 days are capable of sustained flight at 21 days and considered fully fledged at 4-5 weeks.
- e. Birds begin to return to their breeding grounds in Europe from February-March with more southerly populations starting to breed in Late March and April.
- f. Snipe, have many different predators and nests are prone to trampling by cattle and ponies, while flooding and farming activities on wet meadow sites frequently destroy nests.
- g. In the New Forest, large scale wetland restoration projects have been completed and more are planned, to assist in upholding its RAMSAR status as a wetland of international importance to wading birds.

Snipe Methods

- a. The proposed 2020 survey for breeding Snipe was to cover all 1km squares of the Crown Lands covered by the Verderers of the New Forest HLS agreement, and adjacent National Trust Hampshire County Council and Wellow Parish Council commons containing habitat with the potential to support breeding Snipe. From 164 squares containing some wetland habitat it was decided that 23 squares did not contain enough to support breeding Snipe leaving 141 requiring survey.
- b. However, the unforeseen circumstances of the Covid 19 pandemic saw government restrictions on travel and exercise make it impossible for HOS volunteers to fulfil their commitment to the Snipe survey and we had to stand down the volunteer team that we had recruited for 2020.
- c. Fortunately, to gather data on the effects of lockdown on the Forest's waders, Wild New Forest were contracted by FE to survey disturbance and wader populations across the New Forest in the spring of 2020 thus enabling around 100 of the 142 1km squares to be surveyed. To ensure that Snipe numbers had not changed dramatically between 2020 and 2021 the WNF team resurveyed 30 1km squares in 2021 to provide direct comparisons with 2020.
- d. Those squares not covered by WNF in 2020 were surveyed by HOS volunteers in spring 2021 following the lifting of Covid 19 restrictions.
- e. The 2021 survey followed the standard BTO methodology of three visits to each of the survey squares not covered by the 2 contracted surveyors in 2020. The visits were to be undertaken between the 10th of April and the 22nd of June 2021, with at least two weeks between visits to a survey unit and carried out between the following dates, visit one; 10th April 2021 – 30th April 2021, visit two; 1st May 2021 – 21st May 2021 and visit three 22nd May 2021 -22nd June 2021.
- f. The recording methods were the same as those used in previous surveys, except that, suitable areas were walked to within 50 metres rather than 100 metres with the agreement of Natural England. This was hoped to give a slightly more accurate census, since Snipe will often only flush at close quarters.
- g. The locations of all Snipe were recorded, with annotations as to whether birds were flushed, or displaying, and simultaneously displaying males. The first survey period overlaps markedly with early breeding birds and migratory Snipe on the way back to more northerly breeding grounds and careful analysis of subsequent survey data is required to arrive at a figure which better represents the breeding population.
- h. The 1994 (Tubbs & Tubbs) and 2004 (Goater) population estimates relied on extrapolation where sampling was based on random squares containing a minimum of 15 hectares of wet heath/bog habitat. The 2014 survey followed the same habitat types identified in the previous two surveys and considered suitable for breeding waders. Survey units of approximately 150 hectares were then mapped and a suitable transect route determined to allow all suitable habitat to be approached within 100 metres. To better analyse comparisons with previous surveys we also completed a resurvey of 20 of the 80 transects walked in the 2014 RPS survey during 2021 using the 2014 methodology.

Snipe Results

- a. In total 141 1km squares were surveyed over 2020 or 2021 with the result that 181 Snipe territories were found. This is an increase over the survey completed in 2014. For the 2014 survey RPS used 80 pre-planned transects that were designed to get within 100m of suitable wader habitat. For the HOS 1km square survey we asked observers to get within 50m of suitable Snipe habitat which may explain some of that increase. HOS also surveyed 9 new 1km squares not visited in the 2014 survey and found 14 territorial males/pairs.
- b. To ensure that Snipe numbers had not changed dramatically between 2020 and 2021 the WNF team resurveyed 30 1km squares in 2021 to provide direct comparisons with 2020. This 30% sample revealed 32 territories in 2021 against 36 in 2020 - a 12.5% difference, which we feel reflects small movements of birds within the area.

2020 vs 2021 REPEAT SURVEY

| 1KM | 2020 | 2021 | 1KM | 2020 | 2021 |
|--------|------|------|--------------|-----------|-----------|
| SU3400 | 0 | 0 | SU3405 | 3 | 3 |
| SU3401 | 0 | 0 | SU3406 | 1 | 1 |
| SU3500 | 0 | 0 | SU3504 | 3 | 5 |
| SU3501 | 1 | 1 | SU3505 | 1 | 0 |
| SU3600 | 1 | 0 | SU3506 | 0 | 0 |
| SU3601 | 1 | 1 | SU3604 | 1 | 0 |
| SZ3499 | 5 | 4 | SU3605 | 2 | 2 |
| SZ3599 | 1 | 1 | SU3606 | 0 | 1 |
| SZ3699 | 3 | 3 | SU3407 | 1 | 0 |
| SU3705 | 5 | 2 | SU3507 | 0 | 2 |
| SU3706 | 1 | 1 | SU3607 | 1 | 1 |
| SU3805 | 0 | 0 | SU3108 | 1 | 0 |
| SU3806 | 0 | 0 | SU3207 | 0 | 0 |
| SU3905 | 0 | 0 | SU3209 | 0 | 0 |
| SU3906 | 4 | 3 | SU3308 | 0 | 1 |
| | 22 | 16 | | 14 | 16 |
| | | | TOTAL | 36 | 32 |

- c. During 2021 and to allow comparisons with the 2014 survey, we completed a resurvey of 20 of the 80 transects walked in the 2014 RPS survey, using the 2014 methodology. 64 different 1km squares were covered (although many of these were only passed through slightly). Three visits at dawn or dusk were made in April, May, and June and although the results varied in some cases between 2014 and 2021, a total of 47 territories were found in both surveys. We feel this shows that had we used the 2014 methodology across all 80 transects the results would have been comparable to 2014.

SNIFE TERRITORIES IN TRANSECT SURVEYS

| | 2014 | 2021 |
|--|-----------|-----------|
| Backley Plain | 2 | 2 |
| Beaulieu Heath East | 1 | 0 |
| Beaulieu Heath West (5 transects) | 4 | 5 |
| Beaulieu Road Station and Bishops Dyke | 5 | 3 |
| Bisterne Common to Dur Hill Down | 1 | 0 |
| Clayhill Bottom | 3 | 3 |
| Dibden Bottom | 2 | 2 |
| Goatspen/Turf Hill | 5 | 4 |
| Holmsley Ridge | 1 | 0 |
| Matley Heath | 0 | 0 |
| Picket Plain to Burley Moor | 3 | 6 |
| Rock Hills | 6 | 3 |
| Rowbarrow | 7 | 8 |
| Strodegemoor Bottom to Cranes Moor | 2 | 3 |
| White Moor to Longwater Lawn | 2 | 2 |
| Wilverley Plain , Duck Hole, Holm Hill | 3 | 6 |
| TOTAL | 47 | 47 |

SQUARES WHERE SNIFE LOST BETWEEN 2014 AND 2020-2021 SURVEY

| 1KM | 2014 | 2020-2021 |
|--------|------|-----------|
| SU1814 | 2 | 0 |
| SU1911 | 1 | 0 |
| SU2000 | 1 | 0 |
| SU2007 | 1 | 0 |
| SU2105 | 1 | 0 |
| SU2106 | 2 | 0 |
| SU2203 | 1 | 0 |
| SU2302 | 2 | 0 |
| SU2702 | 1 | 0 |
| SU3207 | 1 | 0 |
| SU3208 | 1 | 0 |
| SU3806 | 1 | 0 |
| SU3905 | 1 | 0 |
| SU4004 | 2 | 0 |
| SU4104 | 2 | 0 |

**SQUARES WHERE SNIPE GAINED BETWEEN 2014 AND 2020-2021
SURVEY**

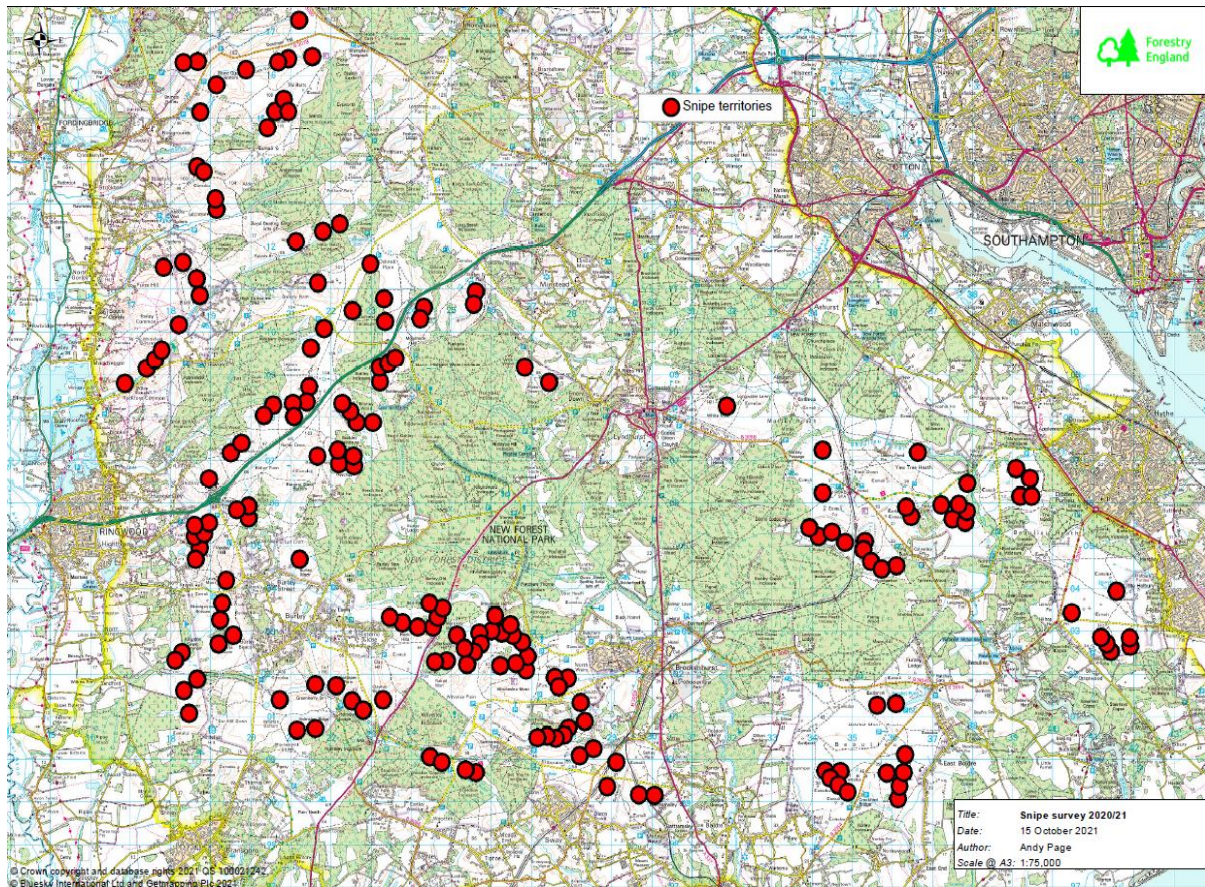
| 1KM | 2014 | 2020-2021 |
|------------|-------------|------------------|
| SU1608 | N | 1 |
| SU1711 | 0 | 1 |
| SU1802 | 0 | 2 |
| SU1804 | 0 | 2 |
| SU1805 | 0 | 4 |
| SU1806 | 0 | 1 |
| SU1810 | 0 | 2 |
| SU1813 | 0 | 2 |
| SU1815 | 0 | 1 |
| SU1816 | 0 | 2 |
| SU1902 | 0 | 2 |
| SU1904 | 0 | 1 |
| SU1913 | 0 | 1 |
| SU1915 | 0 | 1 |
| SU1916 | 0 | 1 |
| SU2008 | 0 | 2 |
| SU2100 | 0 | 2 |
| SU2107 | 0 | 1 |
| SU2108 | 0 | 4 |
| SU2109 | 0 | 1 |
| SU2110 | 0 | 1 |
| SU2111 | 0 | 1 |
| SU2117 | 0 | 1 |
| SU2206 | N | 2 |
| SU2207 | 0 | 3 |
| SU2307 | N | 1 |
| SU2308 | 0 | 1 |
| SU2310 | 0 | 2 |
| SU2311 | 0 | 1 |
| SU2410 | 0 | 2 |
| SU2603 | N | 3 |
| SU2609 | 0 | 1 |
| SU3108 | 0 | 1 |
| SU3305 | N | 1 |
| SU3407 | 0 | 1 |
| SU3501 | 0 | 1 |
| SU3601 | 0 | 1 |
| SU3604 | 0 | 1 |
| SU3605 | 0 | 2 |
| SZ2599 | N | 4 |
| SZ2899 | 0 | 1 |
| SZ3099 | 0 | 1 |
| SZ3499 | 0 | 5 |

SNIPE SURVEY RESULTS BY 1KM SQUARE

| 1KM | 2014 | 2020-21 | 1KM | 2014 | 2020-21 | 1KM | 2014 | 2020-21 |
|--------|------|---------|--------|------|---------|--------------|------------|------------|
| SU1608 | N | 1 | SU2108 | 0 | 4 | SU2802 | 0 | 0 |
| SU1708 | 0 | 0 | SU2109 | 0 | 1 | SU2900 | 0 | 0 |
| SU1709 | 1 | 3 | SU2110 | 0 | 1 | SU3108 | 0 | 1 |
| SU1710 | 0 | 0 | SU2111 | 0 | 1 | SU3207 | 1 | 0 |
| SU1711 | 0 | 1 | SU2112 | 1 | 2 | SU3208 | 1 | 0 |
| SU1801 | 1 | 3 | SU2116 | 2 | 1 | SU3209 | 0 | 0 |
| SU1802 | 0 | 2 | SU2117 | 0 | 1 | SU3305 | N | 1 |
| SU1803 | 0 | 0 | SU2201 | 1 | 3 | SU3308 | 0 | 0 |
| SU1804 | 0 | 2 | SU2202 | 0 | 0 | SU3400 | 0 | 0 |
| SU1805 | 0 | 4 | SU2203 | 1 | 0 | SU3401 | 0 | 0 |
| SU1806 | 0 | 1 | SU2206 | N | 2 | SU3405 | 2 | 3 |
| SU1810 | 0 | 2 | SU2207 | 0 | 3 | SU3406 | 3 | 1 |
| SU1811 | 1 | 2 | SU2208 | 1 | 2 | SU3407 | 0 | 1 |
| SU1812 | 0 | 0 | SU2210 | 1 | 1 | SU3500 | 0 | 0 |
| SU1813 | 0 | 2 | SU2211 | 0 | 0 | SU3501 | 0 | 1 |
| SU1814 | 2 | 0 | SU2212 | 1 | 1 | SU3504 | 6 | 3 |
| SU1815 | 0 | 1 | SU2213 | 0 | 0 | SU3505 | 1 | 1 |
| SU1816 | 0 | 2 | SU2216 | 0 | 0 | SU3506 | 0 | 0 |
| SU1900 | 0 | 0 | SU2301 | 1 | 1 | SU3507 | 0 | 0 |
| SU1901 | 0 | 0 | SU2302 | 2 | 0 | SU3600 | 1 | 1 |
| SU1902 | 0 | 2 | SU2303 | 3 | 2 | SU3601 | 0 | 1 |
| SU1903 | 2 | 2 | SU2307 | N | 1 | SU3604 | 0 | 1 |
| SU1904 | 0 | 1 | SU2308 | 0 | 1 | SU3605 | 0 | 2 |
| SU1905 | 1 | 3 | SU2309 | 1 | 3 | SU3606 | 0 | 0 |
| SU1906 | 0 | 0 | SU2310 | 0 | 2 | SU3607 | 1 | 1 |
| SU1907 | 1 | 2 | SU2311 | 0 | 1 | SU3705 | 2 | 5 |
| SU1911 | 1 | 0 | SU2315 | 0 | 0 | SU3706 | 3 | 1 |
| SU1912 | 1 | 1 | SU2316 | 0 | 0 | SU3805 | 0 | 0 |
| SU1913 | 0 | 1 | SU2400 | N | 0 | SU3806 | 1 | 0 |
| SU1914 | 0 | 0 | SU2402 | 1 | 2 | SU3905 | 1 | 0 |
| SU1915 | 0 | 1 | SU2403 | 1 | 5 | SU3906 | 1 | 4 |
| SU1916 | 0 | 1 | SU2410 | 0 | 2 | SU4002 | 0 | 0 |
| SU1917 | N | 0 | SU2415 | 0 | 0 | SU4003 | 3 | 1 |
| SU2000 | 1 | 0 | SU2416 | 0 | 0 | SU4004 | 2 | 0 |
| SU2001 | 1 | 1 | SU2502 | 2 | 6 | SU4102 | 3 | 5 |
| SU2007 | 1 | 0 | SU2503 | 0 | 0 | SU4103 | 3 | 1 |
| SU2008 | 0 | 2 | SU2510 | 1 | 2 | SU4104 | 2 | 0 |
| SU2011 | 0 | 0 | SU2601 | 0 | 0 | SZ2499 | 0 | 0 |
| SU2012 | 0 | 0 | SU2602 | 4 | 7 | SZ2599 | N | 4 |
| SU2014 | 1 | 1 | SU2603 | N | 3 | SZ2899 | 0 | 1 |
| SU2015 | 1 | 3 | SU2609 | 0 | 1 | SZ2999 | 1 | 2 |
| SU2016 | 1 | 2 | SU2700 | 1 | 5 | SZ3099 | 0 | 1 |
| SU2100 | N | 2 | SU2701 | 1 | 3 | SZ3499 | 0 | 5 |
| SU2101 | 4 | 1 | SU2702 | 1 | 0 | SZ3599 | 2 | 1 |
| SU2104 | 1 | 1 | SU2703 | 0 | 0 | SZ3699 | 1 | 3 |
| SU2105 | 1 | 0 | SU2708 | 1 | 1 | | | |
| SU2106 | 2 | 0 | SU2800 | 4 | 3 | | | |
| SU2107 | 0 | 1 | SU2801 | 4 | 1 | TOTAL | 102 | 181 |

N = no survey undertaken in 1km square in 2014

Squares containing Snipe 2020/21



Snipe Evaluations and Conclusions

- a. The Forest's vegetation management (primarily controlled burning) probably affects Snipe less than some of the other wader species given the wet nature of most of its preferred habitat. Numbers of stock grazing the Forest however can have a more significant impact. Large numbers of stock can access, break up and reduce the thick vegetation, particularly purple moor grass, found in many mire systems and make them more attractive and accessible to Snipe for feeding and therefore breeding. On the downside, high stock numbers can increase the chance of accidental trampling or disturbance of nests.
- b. The weather, as always plays a part and we saw extremes in both survey years. 2020 was noted for a dry spring and protracted dry period through early summer leading to significant drying out of the mires and arid conditions which were not conducive for ideal chick rearing conditions. This is likely to become more pronounced as we see further effects from climate change. Conversely, 2021 produced a very late cold spring with frequent wet weather through early summer. This retarded early spring growth and therefore nesting cover for forest waders but meant that chick foraging was much improved due to the wetter summer conditions.
- c. The revised methodology of covering each 1km square to within 50 metres of all suitable habitat rather than the 100 metres of previous surveys, appears to produce a more accurate result of actual birds present. This is not surprising given the Snipe's reluctance to break from cover until the last minute.
- d. Repeating the transect methodology used in 2014 produced very similar results in 2021 affirming the view that the New Forest Snipe population has probably remained stable over the seven- year period between surveys.
- e. Results of comparisons of data produced in 2020 and 2021 again reaffirms the belief that there was no perceivable change in population between the two years.
- f. We believe the 2020/2021 survey result of 181 territorial males/pairs, to show that the New Forest population remains healthy and stable and compares favourably with previous surveys regardless of the methodologies used but that the methods used in 2021 should be adopted for future surveys where a full survey of all 1km squares is the preferred option.

7. FACTORS AFFECTING WADER BREEDING AND SUCCESS

- a. While numerous reports and studies have been concluded on waders, habitat management and key factors affecting them, few specifically relate to the unique set of circumstances prevalent in the New Forest. Although many of the factors reported in the studies may be assumed as relevant to the New Forest they are not always proven. Multiple studies and regular monitoring on lowland wet grassland sites using approved nest monitoring methods have identified predation as the primary cause of Lapwing nest failure, accounting for over 50% of clutch failure in many of the studies (MacDonald & Bolton 2008b; Teunissen *et al.* 2008; Ausden *et al.* 2009). This is now a key factor compounding the declines of lowland waders as they become confined to a decreasing number of isolated suitable breeding sites.
- b. In England and Wales, concern regarding the detrimental impacts of human disturbance on ground-nesting birds increased following the introduction of the Countryside and Rights of Way (CROW) Act 2000 (Bathe 2007). The Act creates a statutory right of pedestrian access for open-air recreation to mountains, moors, heaths, downs, and registered common land. Given the internationally important breeding bird assemblage in many such areas, of which the wader community is an important component (Thompson *et al.* 1995), there is the potential for conflict between rights of access and nature conservation. Effects can vary, from the avoidance of favoured areas or habitats (Gill *et al.* 1996) to reduced levels of breeding success and increased mortality rates (West *et al.* 2002, Murison *et al.* 2007, Stillman *et al.* 2007). Ground-nesting birds such as waders are regarded as being particularly susceptible to human disturbance. Disturbance of incubating birds can expose eggs to increased risk of chilling or predation (Strauss & Dane 1989, Novick 1996), whilst the survival rates of pre-cocial chicks may also be limited through reduced foraging opportunities and increased predation rates (Dowling & Weston 1999, Ruhlen *et al.* 2003).
- c. The number and density of nesting Redshank on some sites is directly linked to the grazing intensity, with nesting densities much higher on lightly grazed sites and lowest on those grazed heavily (Norris *et al.* 1997; Brindley *et al.* 1998; Norris *et al.* 1998). The UK national saltmarsh Redshank surveys identified grazing pressure as a primary correlate of the Redshank population decline, with breeding densities declining most markedly on sites experiencing increases in grazing intensity from un-grazed or light grazing to moderate or heavy grazing (Norris *et al.* 1998).
- d. The requirement of Lapwing for well-grazed short swards for nesting, feeding and chick rearing involves a trade-off because the grazing levels required to keep the sward low has disadvantages in terms of nest and chick trampling. The length of time that livestock are present not only influences trampling rates but also affects the habitat condition. In grasslands grazed with conservation in mind, livestock are best removed over winter. Stocking densities of less than 1 Livestock Unit per ha from mid-May to October have been found to limit trampling while creating the desired sward structure in the following spring, and these levels are now recommended on lowland wet grassland managed for breeding waders (RSPB 2005). Other wader species breed on lowland wet grassland alongside Lapwing and all require slightly different sward conditions. A delicate balance is therefore needed when managing swards, and most sites where breeding waders are a conservation priority will account for these differences by managing swards to provide tussocks and patches of taller vegetation within larger swathes of short sward to benefit the entire species suite. Cattle, when stocked at low–moderate densities, produce the most varied sward structure due their feeding behaviour so are the stock type recommended for managing wet grasslands (Vickery *et al.* 2001).

8. ADDITIONAL WADER DATA

Curlew

During 2020 and 2021 Curlew were again comprehensively surveyed across the New Forest as part of ongoing work into their declining national status. Aided by a PhD student, important data has been gathered on nesting success, productivity, and chick survival, with camera traps now recording the causes of nest predation. The results below are the culmination of literally hundreds of hours of joint fieldwork and represent the most comprehensive coverage for New Forest Curlew to date and reconfirm the accuracy of the 2019 survey work undertaken and published by HOS for the Verderers HLS.

2020 New Forest Curlew Survey results

- a. 50 territories were occupied within the New Forest study area during 2020, 46 by breeding pairs, and 4 where only a single bird was seen. Of the 46 territories, 4 held birds that were only seen intermittently, and no breeding activity was recorded. There were 10 sites with continued occupancy but where no nests were found, probably due to predation occurring before nests could be found. This was despite repeated visits throughout the season and could have been for at least two breeding attempts at each of the 10 sites.
- b. 36 nests were located for 33 of the 46 breeding pairs with re-lays also found at 3 sites. Where nests were visited to record clutch size (18) there were 3 clutches of 3 eggs, 14 clutches of 4 eggs and 1 clutch of 5 eggs.
- c. 16 pairs were predated on eggs including the three re-lays (i.e., 19 nests) plus a further 2 nests which appear to have been predated on or immediately after hatching but where this cannot be conclusively ascertained. If you add to this the 10 sites where predation occurred before nests were even found, we have 60% losses at egg stage.
- d. 14 nests are known to have hatched chicks between the 26th of May, and 12th of June, but heavy losses of chicks quickly ensued with the result that only 3 chicks were known to have fledged the Forest, a productivity figure for Curlew well below that required for maintaining a viable population.
- e. Avian and mammalian predators are widespread and abundant across the Forest and confirming the species responsible for the high nest and chick losses with nest cameras is something we looked to establish in 2021.

2021 New Forest Curlew Survey results

- a. 44 territories were occupied within the New Forest study area during 2021, 43 by breeding pairs, and 1 where only a single bird was seen.
- b. 24 nests were located for 17 of the breeding pairs with re-lays found at 6 sites. Of these relays, 2 pairs were found to have made a total of 3 attempts each, something which was not previously believed to occur. All known clutches contained 4 eggs once laying up was complete.

-
- c. Of the 44 territories, 6 held birds that were only seen intermittently, and no breeding activity was recorded. This may be indicative of single-attempt nests which were predated very quickly after establishment and then the pair left the area. There were a further 8 sites with continued occupancy but where no nests were found, probably due to predation occurring before nests could be found, despite repeated visits throughout the season and could indicate 8-16 further attempts lost to predation.
 - d. Trail cameras were set on 18 nests, to record predation events. This worked effectively in most cases, although stock interference with the cameras was a problem on several occasions. Control cameras were also set nearby to breeding territories to assess predator responses to the equipment.
 - e. 19 breeding attempts (including re-lays) were confirmed as predated at egg stage or during hatching (either from trail camera data or from nest remains), plus a further 1 nest which was predated immediately after hatching.
 - f. 15 nests are known to have hatched chicks, but many young were subsequently lost, with a total of only 8 chicks reaching BTO fledging age. 2 of these chicks were not seen again after reaching this age, and it is possible they were predated shortly after but we cannot be sure. However, previous observations have suggested the birds will remain on or nearby to their established territory well after the chicks have hatched.
 - g. Four sites produced a total of six known young, which left the Forest in August as recruitment to the population.

Lapwing

Although a full forest wide survey was not undertaken during either 2020 or 2021, numerous records were collated as part of other survey work including Snipe and numbers again seem to align considerably well with the 2019 survey work undertaken and written up in this report. 2020 was an extremely dry spring and summer and did not produce the most favourable conditions for breeding waders. 2021 however, after a cold spring moved into a summer of very moderate temperatures and frequent rain. The forest mires remained damp and lush throughout, producing more favourable chick rearing conditions and more fledged Lapwing chicks were noted than in 2020. However, overall population numbers of Lapwing attempting breeding across the Forest were similar in all years and had not increased as hoped in the wetter spring.

Redshank

The extended survey results of 2020 and 2021 show no change to that reported in the 2019 survey and reinforce the conclusions drawn then, that this species retains a very tenuous hold as a breeding wader of the New Forest. 2021 was however the first year for some time that young Redshank were hatched although unfortunately they were subsequently thought predated.

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A tight sitting New Forest Curlew (Shane King)

