Survey of Lesser Spotted Woodpeckers *Dryobates minor* in Kent 2025

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Male Lesser Spotted Woodpecker in the Blean Complex, Kent 2025 (© H. Mathieson).

Abstract

In 2025, the Kent Ornithological Society (KOS) conducted the first county-wide survey of Lesser Spotted Woodpeckers (LSW) *Dryobates minor* to better understand the distribution and status of the species in Kent. Building on methods used in the 2022 Hampshire Ornithological Society (HOS) survey, this pilot survey identified 94 potential sites using ten years of historical sightings data (2013-2022). In total 41 sites were surveyed through the breeding season, 36 by experienced volunteers and five sites using passive acoustic monitors. These devices were found to be extremely effective at detecting LSW in low probability areas.

Overall results show a scattered distribution of LSW across the county, predominantly in areas of ancient woodland with a high density of LSW in the Blean complex – a recognised hotspot for LSW – and surrounding woodlands. As core survey sites were based on areas with historical records of LSW rather than all suitable habitat, results do not show a complete picture of LSW distribution in Kent. The detection of LSW at six new sites during the survey period emphasises that this species is likely to be more widespread than currently realised and under recorded in Kent.

As this pilot survey is the first coordinated LSW study in Kent, these results provide important baseline data that could assist future survey efforts in the county. Repeat surveys at the same sites could help monitor population trends and help inform targeted conservation management of Kent woodlands.

Introduction

In 2009, due to significant declines in their national population and range contraction since the early 1980s, the LSW was designated as a species of high conservation concern and given Red-listed status. Data from the British Trust for Ornithology (BTO) Breeding Bird Atlas revealed a contraction in breeding distribution of over 41% (1968–72 to 2008–11) (Sharrock 1976; Gibbons et al. 1993; Balmer et al. 2013) and the UK population declined by approximately 50% in ten years to 1999 (Balmer et al, 2013). Breeding numbers, compiled by the Rare Breeding Bird Panel (RBBP) suggests that there has been a 14% decline in national breeding numbers between 2012 and 2021 (Eaton et al., 2021). Distribution of this rare species is currently concentrated in

southern and central England, with scattered populations across its former range in Wales and England (Balmer et al., 2013). Although the cause of the decline remains unclear it is often suggested that competition for food and loss of habitat could be the cause, with low breeding success recognised as the main driver for this decline(Balmer et al., 2013; Chalmer et al., 2009; Smith & Smith, 2020).

It is recognised that, due to the elusive nature of the species and difficulties in detecting them, that LSW are under-recorded. This challenge and lack of data has made population changes and declines difficult to assess. Slightly larger than a House Sparrow, preferring to feed in the high canopy of mature woodlands and only calling or drumming for a short period, these birds are extremely difficult to detect (Clements et al., 2015).

LSW are typically seen in wet broadleaf woodlands where there is a large amount of dead and decaying trees (Smith & Smith, 2024; Olsson et al., 1992; Miranda & Pasinelli 2001; Delahaye et al. 2010; Charman et al. 2010) and in orchards (Glue & Boswell 1994). These habitats may be favoured as they provide suitable nesting habitats, with LSW preferring to nest in dead limbs of living trees or deadwood trunks. Wet woodlands and orchards may also be favoured as they provide a greater availability of prey compared to drier woodland areas (Smith & Smith, 2024).

Although reports of LSW have been scattered across Kent throughout the 20th Century (Ticehurst, 1909; Harrison, 1953, Taylor et al, 1981) a reliable population estimate for the county has never been determined. In recent years, data collated by the KOS has suggested that there has been a decline in numbers and a contraction of range in Kent in line with national trends. Between 1988-94 and 2008-13, the estimated number of pairs in Kent fell from 250-500 pairs to 150-200 pairs (Clements et al., 2015). Evidence of breeding success in Kent is extremely limited with only 12 LSW nests recorded in Kent between 2015 and 2025 (Smith et al., 2025).

In the last 10-15 years most recorded sightings of LSW in Kent were in the Blean complex, a series of interconnected oak-dominated ancient woodlands in the north-eastern part of the county. Covering around 28.5 square kilometres (11 square miles) the Blean complex is a recognised hotspot for the species. Recent monitoring indicates relatively high territory densities, with most territories being associated with high-canopy oak woodland near water (such as a stream) (Smith, D. unpublished data).

Methodology

The HOS survey (2022) demonstrated early-season, territory-focused surveys (when LSWs are drumming and calling more frequently) are crucial to monitoring this species as tree branches are still bare (enabling birds to be more easily identified) and territorial and breeding displays are at their peak during this time. The probability of detecting LSW increases with the number of site visits (Charman *et al*. 2010). Charman's study showed that between 1 March and 20 April one visit gave on average a 49% probability of recording LSW, two visits 73%, three visits 91% and four visits 96%. Based on this research a minimum of three site visits was adopted for the 2025 LSW KOS survey.

Survey site selection and allocation

The 2025 KOS survey methodology was based largely on the HOS 2022 survey (Smith et al., 2022). Survey sites were identified using ten years of LSW reports held by the KOS (2013-2022). This dataset was filtered to only include sites where LSW were reported between January and June, to ensure only likely breeding birds where included. In total 94 sites with records of LSW during the breeding season (2013-2022) were identified across the county.

The 94 sites were divided into four categories of probability of detection based on the number of recorded sightings. This methodology mirrored the selection process used for the HOS 2022 survey (Smith et al., 2022).

- Tier 1: (2013-17) (2018-22) – LSW recorded more than once in both five-year periods
- Tier 2: (2013-17) – LSW recorded more than once during this five-year period
- Tier 3: (2013-22) one LSW record submitted during the ten-year period
- Tier 4: (2018-22) LSW recorded more than once during this five-year period

Areas surveyed were not restricted to defined 1km grid squares as many sites crossed monad boundary lines and could limit the effectiveness of the survey, causing areas of suitable habitat to be missed. Based on volunteer efforts, woodland layout and accessibility, areas monitored varied from site to site from less than 1km^2 to more than 2km^2. It should be noted that in some high probability locations (Tier 1), where woodlands were extensive, entire woodland complexes were not surveyed. Efforts were made to ensure low probability sites (Tier 2,3 and 4) were prioritised.

In total, 41 sites were surveyed: 36 by volunteers and five using passive acoustic monitors.

Volunteer-led survey

The methodology used was based on the 2022 HOS (Smith, et al., 2022) and RBBP (Gilbert et al., 2020) LSW survey methods).

In total 26 volunteers assisted with the survey, visiting allocated sites three times between 20 February and 20 April (≥7 days apart) for three hours between sunrise and midday. Based on Charman's 2009 survey, this approach meant that there was a c. 90% probability of detecting birds, if present, across all three survey visits. All suitable habitat within their site was monitored. Locations of LSWs were recorded using what3words, map plot point or GPS/grid reference. Additional information recorded included the number of LSW seen, their sex, behaviour (drumming, calling, displaying, flying, feeding), and time of sighting. Volunteers were encouraged to follow up territories where LSW were detected beyond the core survey period in an effort to locate active nests, but this was optional.

Surveying using passive acoustic monitors

Methodology for using passive acoustic monitors was based on the approach used by Ken and Linda Smith (Woodpecker Network) in 2024 in the New Forest in Hampshire but varied in times of recordings and number of monitors deployed at each site. Detectors were set to record only from sunrise to midday rather than full day periods to focus on peak activity times and reduce the volume of data collected. Also, rather than deploying one monitor at a site, multiple monitors were deployed at the same site to ensure maximum coverage of the woodland. Based on field testing, monitors were positioned 100m apart to ensure maximum coverage and set to record for a minimum of 5 days. Deployment of the monitors took between 1-2 hours and retrieval approximately 1 hour. In periods where there were successive days of bad weather detectors were not deployed in the field.

All sound was recorded, and analysed using the BTO Acoustic Pipeline software programme, giving times, location and raw recordings of all suspected LSW calls and drums.

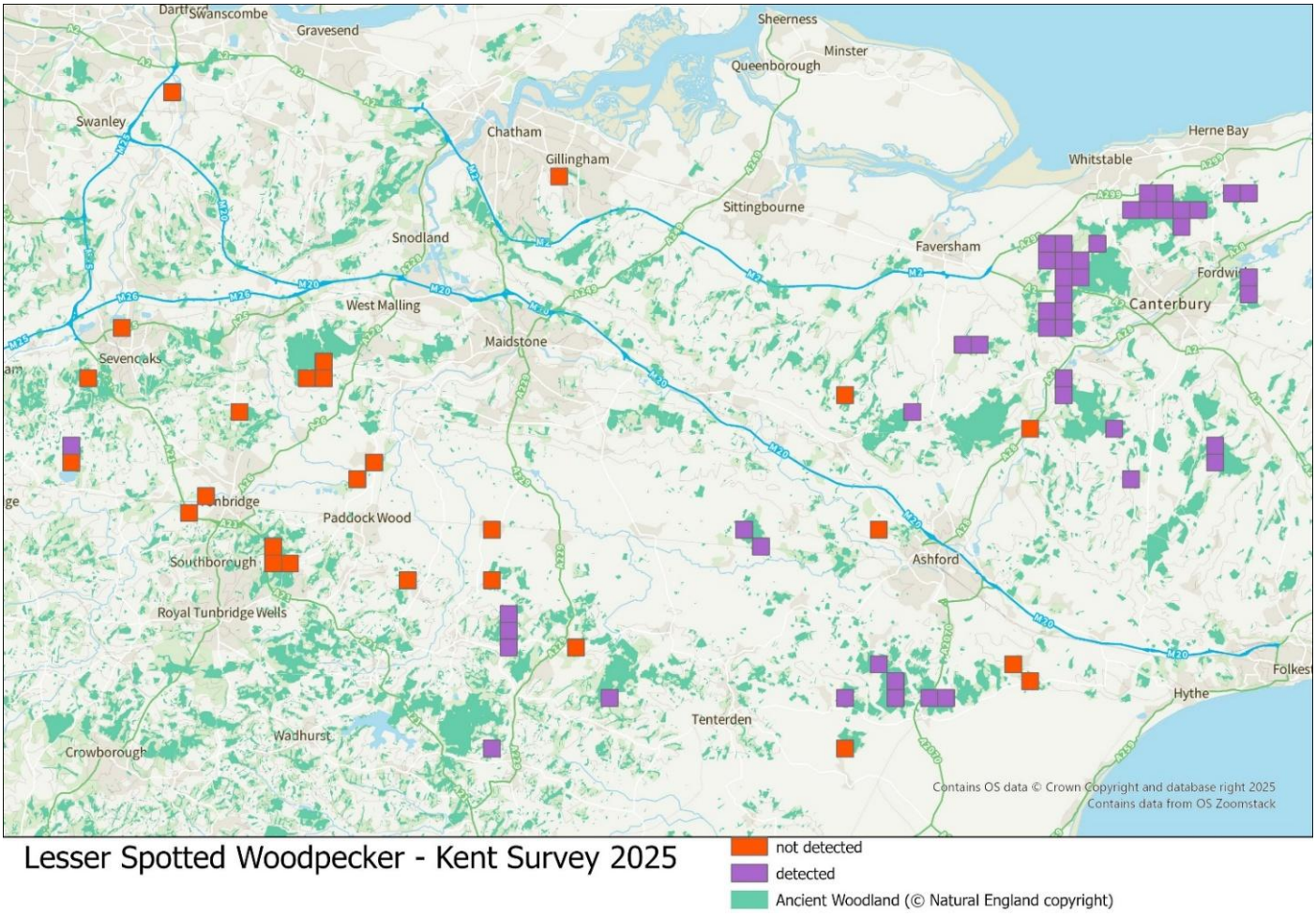
Image 1: Wildlife Acoustic Song Meter Minis fixed to tree trunks. The casing was camouflaged to reduce the possibility of them being seen. Each individual device was programmed to record from sunrise to midday using a smart phone app which links to the devices via a Bluetooth connection (© H. Mathieson).

Results

Survey coverage and detections

In total, 188 records of LSW were submitted by 26 volunteers during the core survey period, over a total of 22 sites. In some areas pairs were seen performing elaborate courtship aerial displays and multiple birds engaging in territorial disputes. LSW were not detected at 19 of the 41 survey sites.

As Map 1 shows, recorded sightings correspond with areas of ancient woodland as mapped using Natural England data. Results show the Blean complex as a hotspot for this species but also highlights that woodlands surrounding the Blean were also of importance. In addition, results revealed that LSW were scattered across the county, with isolated and clustered sightings recorded in the west, central and southern parts of the county. As the map shows there were numerous areas of ancient woodland which were not surveyed in 2025, highlighting that these results do not provide a complete assessment of the populations of LSW in Kent, or its distribution.



Map 1: Approximate location of sites surveyed in Kent in 2025 represented as 1-km squares. Purple squares show the approximate locations where LSW were recorded and red squares show the approximate location of woodlands where they were not detected during three visits carried out during the core survey period. Results are a combination of data from volunteer-led surveys and data gathered using passive acoustic monitors. Survey sites include 41 core survey sites and also six additional new sites where LSW had not been recorded during 2013-2022.

Tier	Time period of tier	Total number of sites with historic records of LSW (2013-2022)	No. of sites surveyed in 2025	LSW recorded (2025)	LSW not recorded (2025)	Number of sites with confirmed breeding*
1	(2013-2017) +(2018-2022)	22	16	12	4	4
2	(2013-2017)	3	2	0	2	0
3	only 1 record (2013-2022)	61	17	7	10	0
4	(2018-2022)	8	6	3	3	0
TOTAL	2013-2022	94	41	22	19	4

Table 1: Results of the 2025 Kent LSW survey combining data from voluntary surveyors and passive acoustic monitors *Breeding is confirmed if a nest is located or if multiple juvenile LSW are seen in the area during the breeding season.

In total, LSW were detected in 22 of the 41 sites surveyed (19 confirmed by voluntary surveyors and three with the use of acoustic monitors). 54.5% of sightings recorded at high probability Tier 1 sites - where LSW have been detected multiple times over the ten-year period (during 2013-2017 and 2018-2022). This highlights a pattern of site fidelity during the breeding season, and sites that have been occupied for more than five years have a much higher rate of detection. Interestingly, LSW were located at 41% of Tier 3 sites surveyed (where LSW had only every been recorded once in the ten-year period 2013-2022). At one site the last report of a LSW was nine years previously, in 2016. This could be because of low survey efforts in these areas over the years, accessibility issues or fluctuations in population range during this period.

LSW were detected at 75% of all surveyed Tier 1 sites and 50% of all surveyed Tier 4 sites. At the three Tier 2 sites (where LSW had been recorded more than once between 2013 and 2017), no LSW were located during the 2025 survey. This could be a result of changes in habitat suitability or the loss of isolated populations (Figure 1).

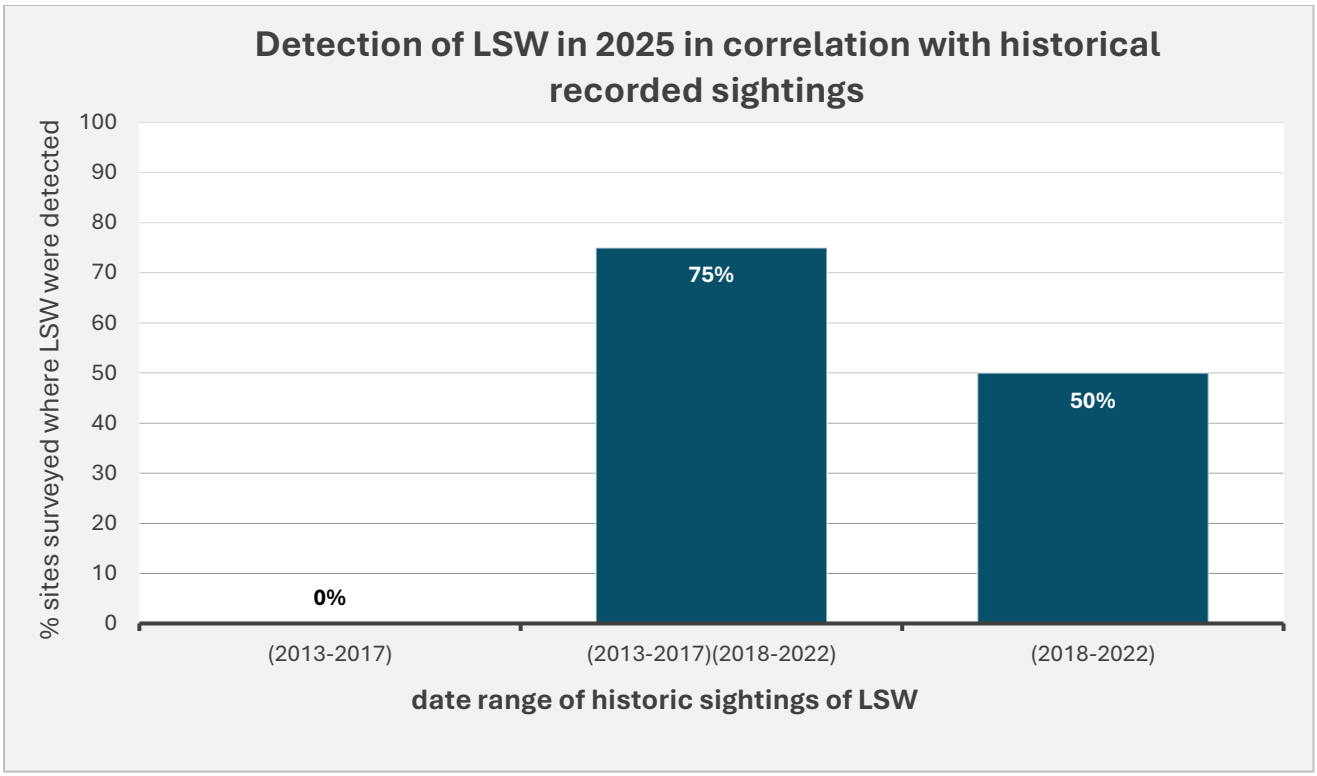


Figure 1: The percentage of sites with historical records of LSW, broken down into five- and ten-year date ranges, where LSW were recorded in 2025.

Passive acoustics monitors

Five passive acoustic monitors (Wildlife Acoustic Song Meter Minis) were deployed across a total of five sites in Kent. Four sites were classed as low probability sites as there had only been 1-2 confirmed sighting of LSW recorded between 2013 and 2022. At some sites maximum coverage was achieved using all five detectors. At one site (>2km^2) a sequential deployment was required to ensure maximum coverage of the wood. Analysis of recording data showed that in some low priority woodlands LSW were not detected by all passive acoustic detectors, highlighting that detection rates correlated with number of detectors deployed at sites.

Over 600 hours of sound recordings were analysed using the early-stage design of the BTO LSW Acoustic Pipeline software programme (currently under development). In total 94 suspected LSW calls, and 224 drums were identified by the program of which 43% were validated as LSW by an experienced volunteer. Misidentification was expected as the software program was at an early stage of development. However, even with this margin of error the software program enabled huge data sets to be analysed quickly, assisting the overall process of data analysis significantly.

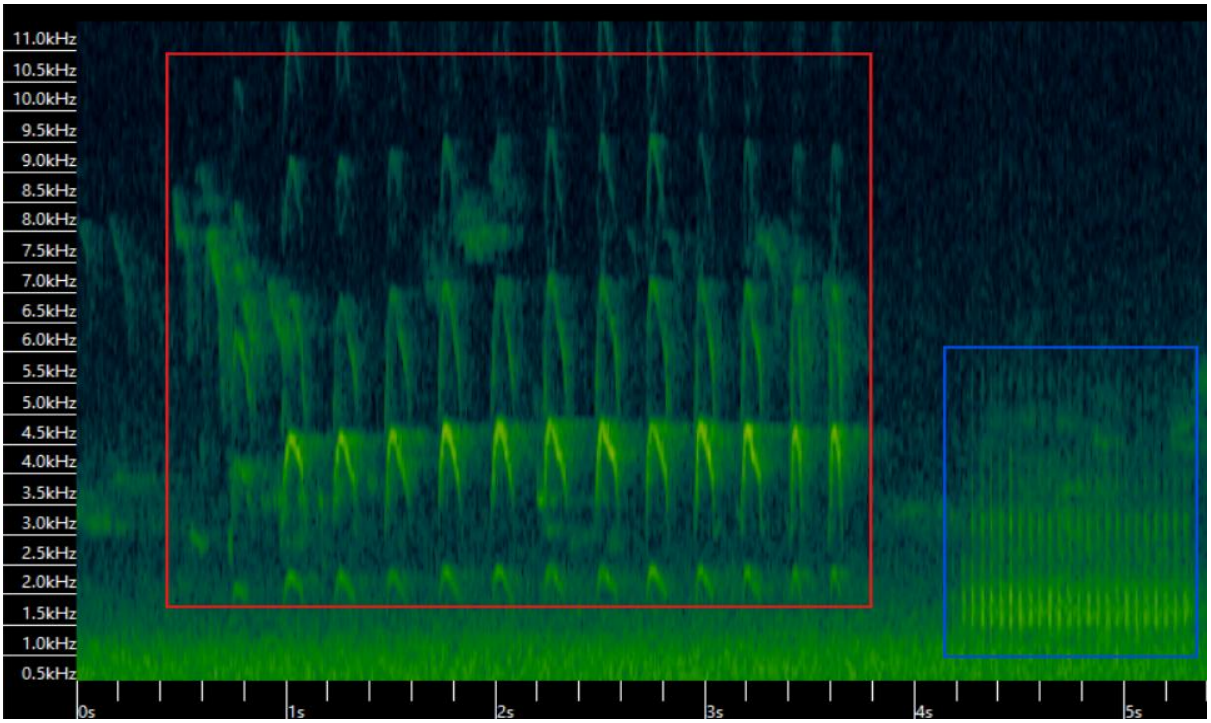


Figure 2: Sonogram of a LSW call and drum shown on the Kaleidoscope sound analysis app. The call series lasting 3.0 seconds (highlighted in red) is followed by a 1.1 second drumming series (highlighted in blue). The call consists of 14 separate notes comprising five frequency bands, with the loudest recorded at approximately 4.88kHz. The drumming section comprises 24 individual taps with the loudest recorded frequency approximately 2.0kHz.

Lesser Spotted Woodpeckers were detected at three of the five sites where passive acoustic monitors were deployed. All three sites were classed as low probability sites, with only 1-2 sightings of LSW recorded between 2013-2022. Deployment and retrieval of the passive acoustic monitors took approximately 2-3 hours. This was always done in the morning in good weather conditions. Despite this time in the field, notably no LSW were detected in any of these sites during deployment and retrieval of monitors.

Analysis of the times of validated calls and drums detected across three sites (Figure 3) showed that birds were calling and drumming from 6.25am 11.02am with activity largely occurring form 9-9.30am. As drumming and calling activity at active sites is recorded to decline throughout the morning (Smith et al., 2025) this could suggest that in these areas territory sizes stretch beyond the survey area with individuals roaming more widely, or that as a consequence of low population densities of LSW in the area these the rate of territorial or breeding calls and drumming was at a lower rate than would be observed in areas with higher densities. As this data is not statistically significant these theories are speculative.

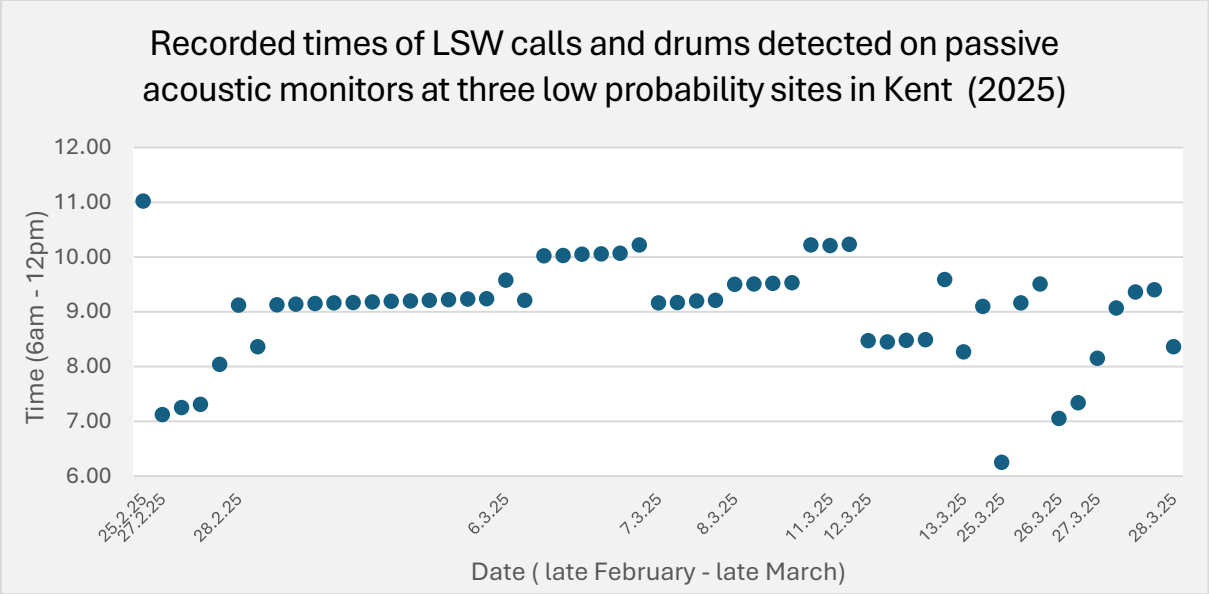


Figure 3: Times and dates of LSW calls and drums recorded on passive acoustic monitors at three low probability sites in Kent. Activity of LSW was recorded from 6.25am to 11.02am, with most calls and drums being recorded between 9am and 9.30am.

Additional sites

During the survey volunteers identified LSW at six sites which were not core survey sites, bringing the total number of sites where LSW were detected during the survey period in 2025 to 28. LSW had not been recorded at any of these six new locations during 2013-2022.

Confirmed breeding

At four of the 22 survey sites where LSW were detected, follow up visits by volunteers in May and June resulted in active nests being located at two sites and juvenile birds seen at two other sites. At all four sites multiple sightings of LSW were recorded between 2013-2022, highlighting that these are long-established LSW territorial sites.

The two active nests were in the Blean complex in late May. Both nests were assessed by Ken and Linda Smith (Woodpecker Network), using an endoscope. Four healthy chicks were seen in one nest (three males and a female – see Image 2) and three healthy chicks were seen in the other (two males and one female). All chicks successfully fledged - a total of two females and five males, with an average productivity of 3.5 young per nest. This is slightly lower than the national average for 2025 of 3.8 young fledged per nest.

Image 2: Photo taken using an endoscope showing four LSW chicks in a nest found in the Blean complex in May 2025 at one of the survey sites (© Ken Smith).

Site occupancy estimates

Using data from the 2025 survey it is possible to estimate the overall number of historic sites where LSW are present. It is estimated that of the 94 sites with historical recordings of LSW (2013-22), a total of 46 sites are likely to have LSW present (Table 2).

Territory estimates

For each of the 22 core survey sites where LSW were detected, locations of sightings were plotted and distances between plot points were measured to determine the number of territories within each site. Using the same methodology as the HOS survey, where LSW were present, territory numbers were calculated using mapped location data. Clusters of detections approximately 500-600 metres away from other sightings were interpreted as separate territories (Smith et al., 2022). In addition to using this rule, at sites where multiple territories were located, in-depth field notes submitted by experienced volunteers were also used to estimate the total number of territories present. In total 38 LSW territories were located across the 22 sites surveyed.

Based on this data, the total number of territories for all 94 sites with historical records of LSW during 2013-2022 could be calculated. It is estimated that 68 LSW territories would be present across all 94 sites (Table 2).

As results are based only on sites with historical records (not all potential sites with suitable habitat in Kent) these estimates are not an accurate representation of the Kent population or territory numbers for the whole county and are an underestimate of actual population numbers.

Tier	Time period of historical records	No. of sites with historic records of LSW (2013-22)	No. of sites surveyed in 2025	No. of sites where LSW detected	No. of territories* located	Estimated average no. of territories per site	ESTIMATED total number of historic sites with LSW detected	ESTIMATED number of territories across all historic sites
1	(2013-2017) + (2018-2022)	22	16	12	28	2.33	16.50	38.45
2	(2013-2017)	3	2	0	0	0	0	0
3	only 1 record (2013-2022)	61	17	7	7	1	25.12	25.12
4	(2018-2022)	8	6	3	3	1	4	4
	TOTAL	94	41	22	38		45.62	67.57

Table 2: Estimated number of sites and territories where LSW are present in Kent, based on the proportion of tiered sites with recorded sightings of LSW in 2025. *A territory is based on fieldworker observations or defined territorial sizes with clusters of sightings located 500-600m away from another LSW sighting regarded as a different territory. This is based on the same methodology used in the HOS LSW survey (Smith et., 2022).

Discussion

Results show that the distribution of LSW in Kent is closely linked to woodland type with most sightings recorded in areas of ancient woodlands. As woodland type and habitat conditions were not recorded during the survey, these details cannot be expanded on at this time, but could be examined in the future., Anecdotal evidence suggests that LSW in Kent prefer oak-dominated, wet woodland types. As not all areas of ancient woodland were surveyed during the 2025 survey, it is highly likely that many LSW territories were missed, therefore the survey results do not fully represent the distribution or population of LSW in the county.

It is highly likely that LSW occurs more widely in Kent than current records indicate. This was clearly demonstrated with reports of six additional sites during the survey period in woodlands not previously surveyed for LSW. Expanding survey coverage in the future to include other areas of ancient woodland with suitable habitat conditions, with a greater focus on western, central and southern areas of Kent, would give a more accurate understanding of LSW distribution in the county.

In addition to providing valuable baseline data for future repeat surveys, this study has also enabled survey techniques and methodologies for LSW to be reviewed which could assist future LSW survey work. As the 2025 survey revealed, passive acoustic monitors are a reliable and effective tool for detecting LSW and should form an integral component of future monitoring. While these devices can only confirm presence or absence, their value in detecting LSW – particularly at low probability sites – is extremely valuable, providing crucial records which may be missed through volunteer surveys.

Amendments to the survey period should also be considered. Audible detection of LSW at some sites became more difficult in April due to an increase in competing bird song coinciding with the arrival of spring migrants. This was particularly noticeable in the early hours of the morning. As this could reduce rates of detection both by volunteers and passive acoustic monitors it would be useful to consider an earlier survey start date. Field observations also indicate that territorial activity may occur earlier in the season compared with even 15 years ago. If weather conditions were suitable, the probability of detection could potentially increase by bringing the survey start date forward from 20 February to late January or early February. Additional visits in mid to late May is also recommended in future surveys at sites with confirmed presence. Site visits during this period when nestlings are likely to be vocal would increase the chances of locating active nests, providing an opportunity to monitor LSW breeding success.

Based on these findings, to provide a more accurate assessment of LSW distribution, abundance, and productivity across Kent we recommend that future survey programmes: (i) repeat surveys of key sites every 3–5 years, combining passive acoustic monitors (for low probability and new sites) with volunteer fieldwork to assist in obtaining additional data; (ii) record habitat features of sites to assess preferred conditions; (iii) expand coverage to include other low-probability sites and previously unsurveyed woodlands where habitat is suitable; and (iv) amend the core survey period to late January/early February and include later visits in May to assist in detecting active nests and the assessment of breeding success.

Conclusions

Although LSW remain a rare and elusive species in Kent, populations are present across the county, with woodlands around Canterbury (including the Blean complex) a clear hotspot for the species, confirming that Kent is an important county for this red-listed species.

The KOS 2025 LSW pilot survey has provided valuable baseline data and created a repeatable framework for tracking LSW numbers and distribution in Kent. Repeating this survey at defined intervals of 3-5 years would allow changes in range and the number of occupied territories to be measured against variables including habitat management and climate-linked factors.

In the interim years, further efforts should be concentrated on identifying and surveying new and low probability sites, particularly in southern, central and western areas of the county, to help establish a more accurate understanding of LSW distribution in Kent.

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