



Feral wild boar and deer in the Forest of Dean Public Forest Estate



Annual ungulate survey



Feral wild boar and deer in the Forest of Dean Public Forest Estate: Annual ungulate survey

Research Report

Cally Ham



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Enquiries relating to this research should be addressed to:

Dr Cally Ham
Forest Research
Alice Holt Lodge
Farnham
Surrey GU10 4LH
cally.ham@forestresearch.gov.uk



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Introduction

The Forest of Dean in southwest England maintains substantial populations of native and non-native ungulate species. Throughout the forest and the surrounding area there are populations of roe deer (*Capreolus capreolus*), fallow deer (*Dama dama*), muntjac (*Muntiacus reevesi*), and feral wild boar (*Sus scrofa*). These species have important implications for the ecology, economics, and social dynamics of the surrounding region.

Presence of ungulate species, especially feral wild boar (which are sparsely distributed across Great Britain as a whole), attracts visitors for recreational photography and sightseeing. Furthermore, deer and feral wild boar play an important role in maintaining the ecological condition of woodlands through rooting, browsing, and grazing (Mackinnon *et al.*, 2025; Sandom *et al.*, 2013). However, where these species are present at higher density, they can negatively impact forestry and agriculture, where the ground disturbance and feeding on crop trees and plants can have important economic consequences (Mackinnon *et al.*, 2025; Piekarczyk *et al.*, 2021) and additional potential impacts on plant health via pathogen transmission (Liu *et al.*, 2021), bark damage, or over browsing (Gill, 1992). Additionally, road traffic accidents involving deer and boar present a risk to human life (Bíl *et al.*, 2021) and there are concerns around the safety of undertaking other recreational activities, such as dog walking, in the presence of feral wild boar (Klinkenberg, 2024).

The need to manage deer has been highlighted in the recently published *Deer Impacts Policy Statement* (Defra, 2026), which outlines the Government's plans to enhance deer control to the benefit of sustainable deer and forest management. Important to long term management of ungulate populations is understanding the population size, demography, and distribution. The Forest of Dean represents the best example of long term ungulate population monitoring in England, where annual surveys have been conducted repeatedly since 2013 (with some years missed), following the same distance sampling method (Buckland *et al.*, 2001). The regular, repeated monitoring facilitates ungulate population management throughout the Public Forest Estate of the Forest of Dean.

In this report, we provide the population estimate results from the 2026 survey and discuss them in the context of previous surveys.

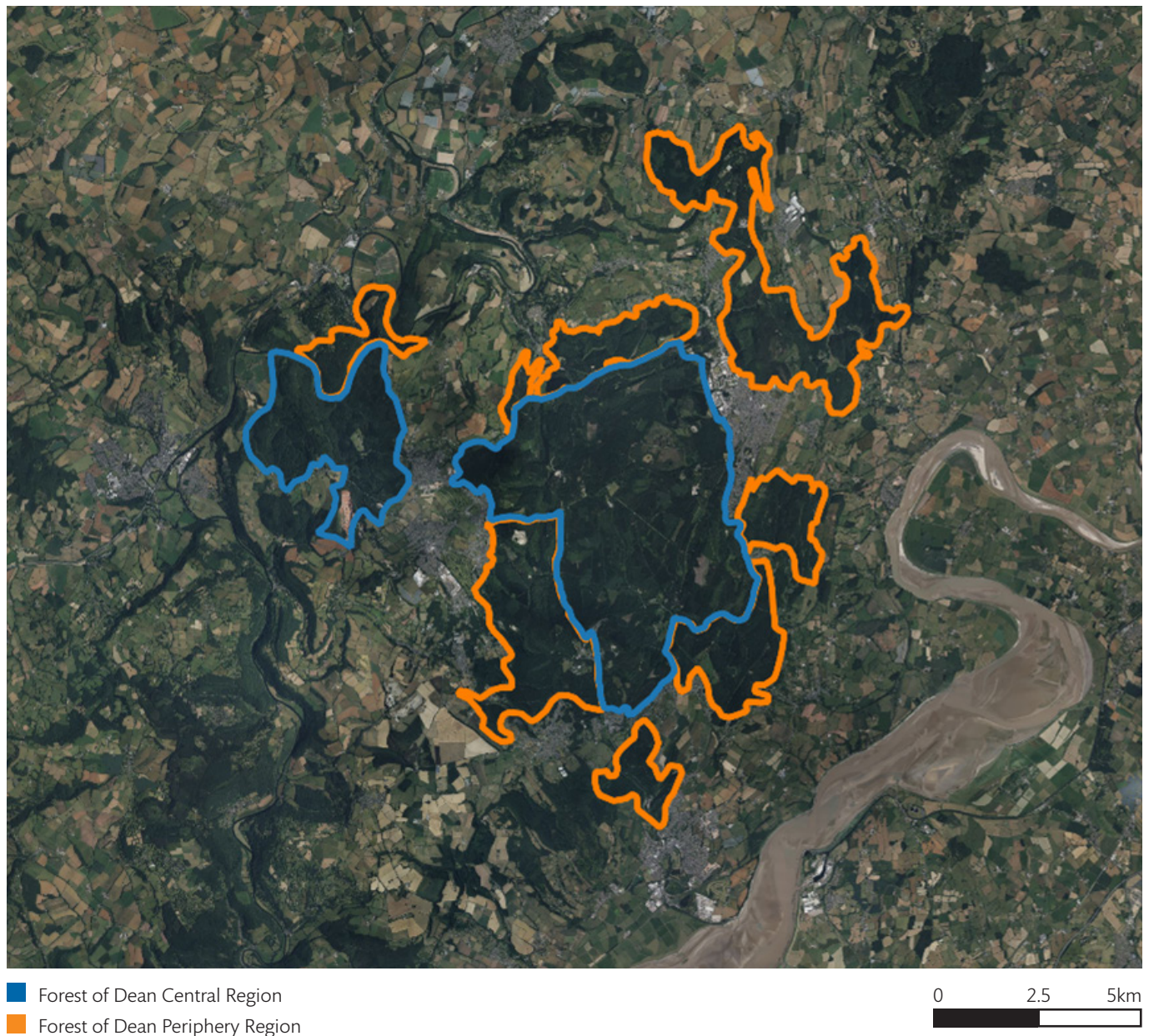
Methods

Data collection

Thermal surveys were conducted at night between 2nd and 17th March 2026 by Forestry England. The same transects as previous surveys were driven, except for cases where the tracks had become impassable. Each transect was driven once, with two observers in each vehicle (one each side) using thermal scopes to detect and identify ungulates. Upon detection, the location, species, group size, distance, and angle to each group of ungulates was recorded.

The survey area was categorised into Central and Periphery regions. This reflects broad variation in forest type, which influences deer and feral wild boar detectability (Figure 1). The Central and Periphery regions are the same as surveys from previous years.

Figure 1 Map of the Central and Periphery regions of the Public Forest Estate within the Forest of Dean.



Data analysis

Data preparation

Data was prepared to facilitate distance analysis (Buckland *et al.*, 2001) in line with previous Forest of Dean annual reports.

The observed angle and distance from the transect to each observed group was converted into a perpendicular distance for analysis; this has two stages. In stage one, recorded angles were standardised using:

$$\text{Angle}_{180} = ((\text{Angle}_{\text{deg}} + 180) \bmod 360) - 180$$

Where Angle_{180} is the observed angle in degrees and $\text{Angle}_{\text{deg}}$ represents the absolute angular deviation from the transect constrained between $0^\circ - 180^\circ$.

In stage two, distances were converted to represent the perpendicular distance (in metres) from the transect using:

$$\text{Distance} = \text{Distance}_m \times \sin(\text{Angle}_{180} \times \pi / 180)$$

Where Distance_m is the observed distance.

For population estimates, each of the deer species observed (fallow, muntjac, and roe) were combined into a 'deer' category. This ensures that sufficient data is available to provide statistically robust results. Feral wild boar were analysed individually.

We used the same Central and Periphery regions as used previously to maintain continuity of analyses.

Distance analysis

Distance analysis was conducted using the package Distance (Miller *et al.*, 2019) within the statistical software R version 4.5.2 (R Core Team 2025). We modelled population density in four models:

1. Deer in the Central region
2. Deer in the Periphery region
3. Feral wild boar in the Central region
4. Feral wild boar in the Periphery region

In all cases we assessed half-normal (HN) and hazard-rate (HR) detection functions and used the Akaike Information Criterion (AIC) values (Akaike, 1973) and visual inspection of detection probability graphs to choose the most appropriate function for the final model.

We selected the truncation distance for each model based on the distribution of observed distances and excluded distances beyond which few observations were made.

Results

General

A total distance of 238 km was surveyed (134 km in the Central region and 104 km in the Periphery region). These transects reflected an area of 46.7 km² in the Central region and 44.0 km² in the Periphery region.

Deer – Central region

A total of 122 groups of deer were detected during the survey: 90 fallow groups, 9 roe groups, and 29 muntjac groups (Figure 3). We used a truncation distance of 125 m for the distance analysis fitted with an HN detection function. This generated an estimate of 384 (95% confidence interval: 292–507) individual deer within the Central region at a density of 7.17 (95% confidence interval: 5.43–9.54) deer per km² (Figure 4).

Deer – Periphery region

A total of 110 groups of deer were detected during the survey (Figure 2): 38 fallow groups, 27 roe groups, and 49 muntjac groups. We used a truncation distance of 125 m for the distance analysis fitted with an HR detection function. This generated an estimate of 455 (95% confidence interval: 361–573) individual deer within the Periphery region at a density of 10.51 (95% confidence interval: 7.91–13.97) deer per km² (Figure 4).

Deer – general

Combining both Central and Periphery regions, we observed average group sizes of: fallow 3.69 individuals, muntjac 1.49 individuals, and roe 2.33 individuals (Figure 5).

We found a decline in the estimated number of deer present across the Forest of Dean as a whole in comparison to previous surveys (Figure 6). This is supported by an overall reduction in the number of groups observed during the surveys in both the Central and Periphery regions (Figure 2).

Feral wild boar – Central region

A total of 25 groups of feral wild boar were detected during the survey (Figure 3). We used a truncation distance of 100 m for the distance analysis fitted with an HN detection function. This generated an estimate of 78 (95% confidence interval: 46–132) individual feral wild boar within the Central region (Figure 7) at a density of 1.66 (95% confidence interval: 0.97–2.82) boar per km².

Feral wild boar – Periphery region

A total of 16 groups of feral wild boar were detected during the survey (Figure 3); this is relatively few observations upon which to base the population model and so we suggest it is interpreted with caution. We used a truncation distance of 75 m for the distance analysis fitted with an HN detection function. This generated an estimate of 112 (95% confidence interval: 60–211) individual feral wild boar within the Periphery region (Figure 7) at a density of 2.55 (95% confidence interval: 1.35–4.79) boar per km².

Feral wild boar – general

Combining both the Central and Periphery regions, we observed an average group size of 5.21 individuals (Figure 5).

The total estimate of feral wild boar within the Forest of Dean is lower than estimates in previous years (Figure 8, solid line), with 95% confidence interval (Figure 8), which is in line with the lower number of observed groups, especially within the Periphery region. However, we caution that the estimates for the Periphery region are based on relatively few observations (Figure 2).

The results of the 2026 thermal imaging survey across the Public Forest Estate in the Forest of Dean suggest a reduction in both deer and feral wild boar numbers compared with previous survey years. For both species groups, the 2026 data shows the lowest estimated population since surveys began in 2013.

This pattern is apparent in the raw survey observations and is broadly reflected in the modelled population estimates. While these findings point towards a possible decline in ungulate abundance, they should be interpreted with an appropriate degree of caution.

For feral wild boar in particular, the low number of detections within the Periphery region results in greater uncertainty in the estimated population size for that area. As a consequence, the precision of the modelled estimates for feral wild boar is reduced, and year-to-year comparisons should be treated carefully.

Nevertheless, when considered alongside the results from the Central region and the overall reduction in observed detections, the results are consistent with a lower feral wild boar presence in 2026.

Overall, the 2026 survey provides evidence indicative of a decline in ungulate numbers within the forest, although uncertainty remains, particularly where detections were sparse. These results are best viewed as part of a longer-term monitoring programme, and confirmation of population trends will benefit from continued surveys in future years and consideration of additional sources of information.

Figure 2 The observed number of deer and feral wild boar groups per year (where data is available) within the Central and Periphery regions



Figure 3 Observed number of groups per species in 2026

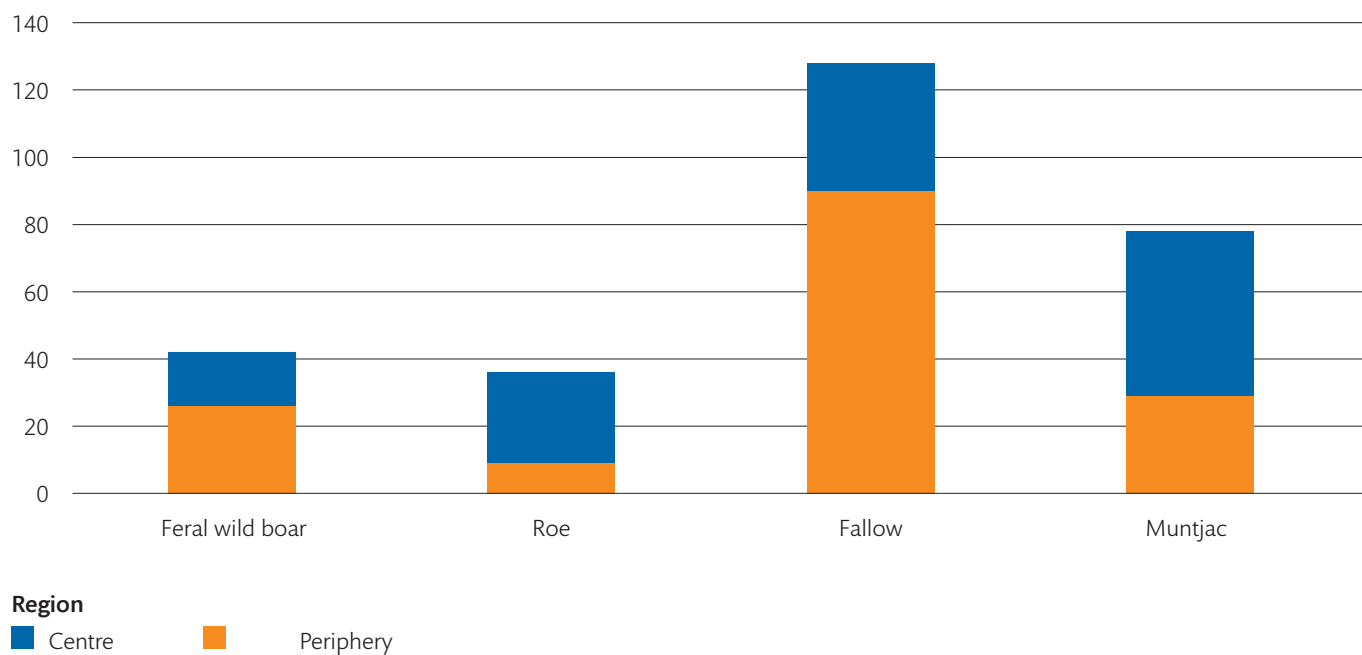


Figure 4 Modelled abundance with 95% confidence intervals of all deer within the Central and Periphery regions in 2026. Based on the output of the distance analysis.

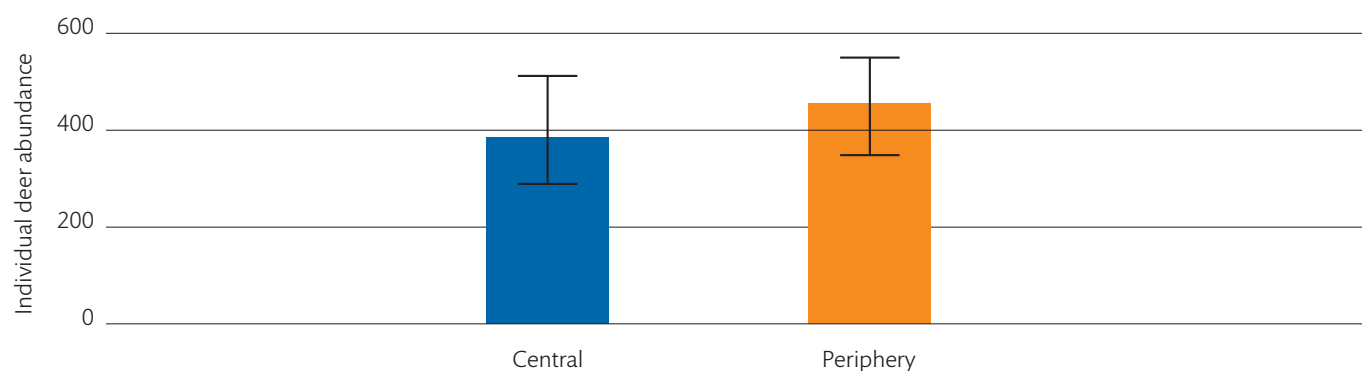


Figure 5 Violin plot to show the distribution of group sizes observed during the 2026 surveys for each species. The boxplot shows the median with interquartile range. The full extent of the violin shows the full range of the group sizes.

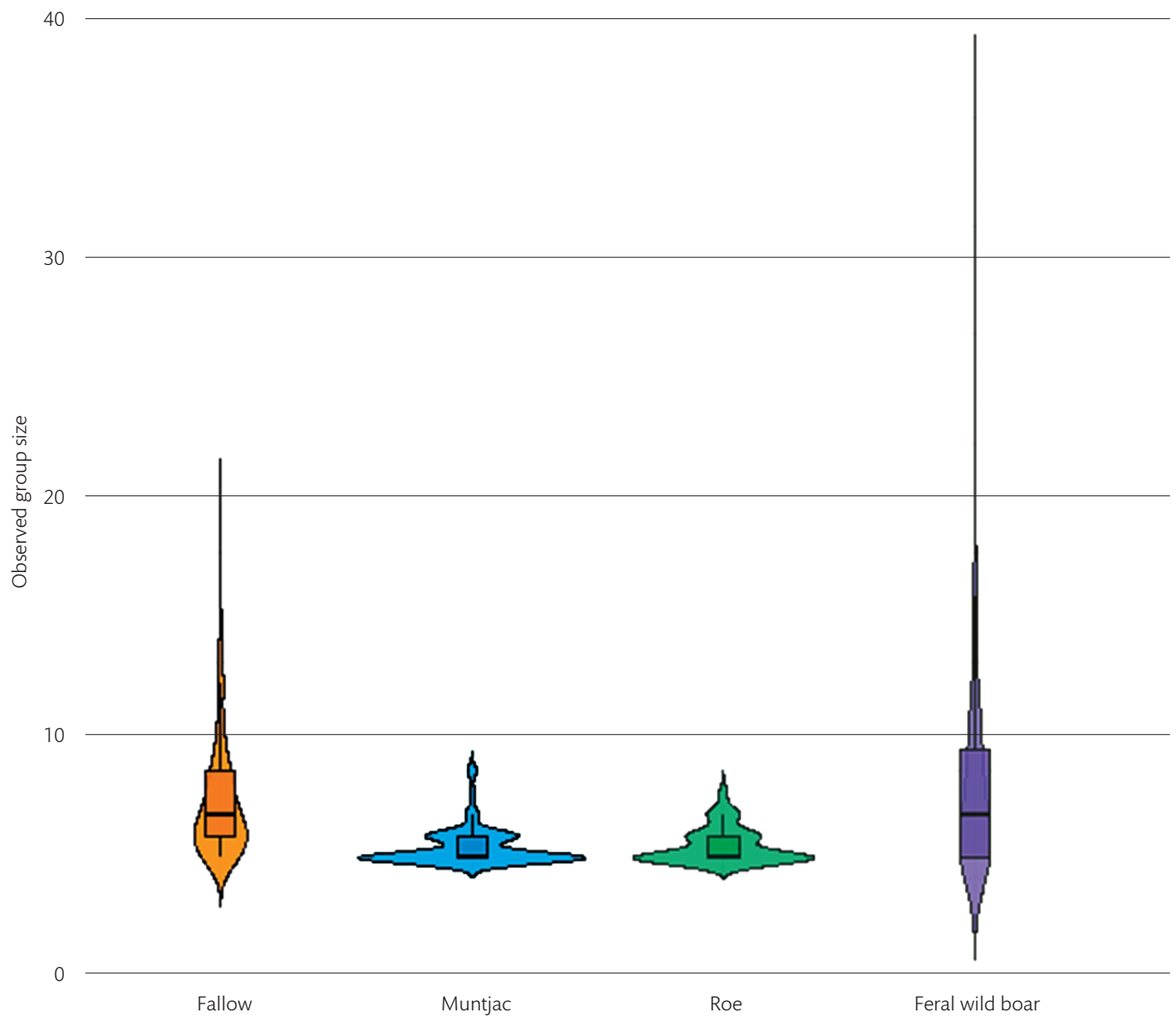


Figure 6 Estimated total deer population (solid line), with 95% confidence intervals (shaded area) for the Forest of Dean based on the output of distance analyses for each year where survey data is available.

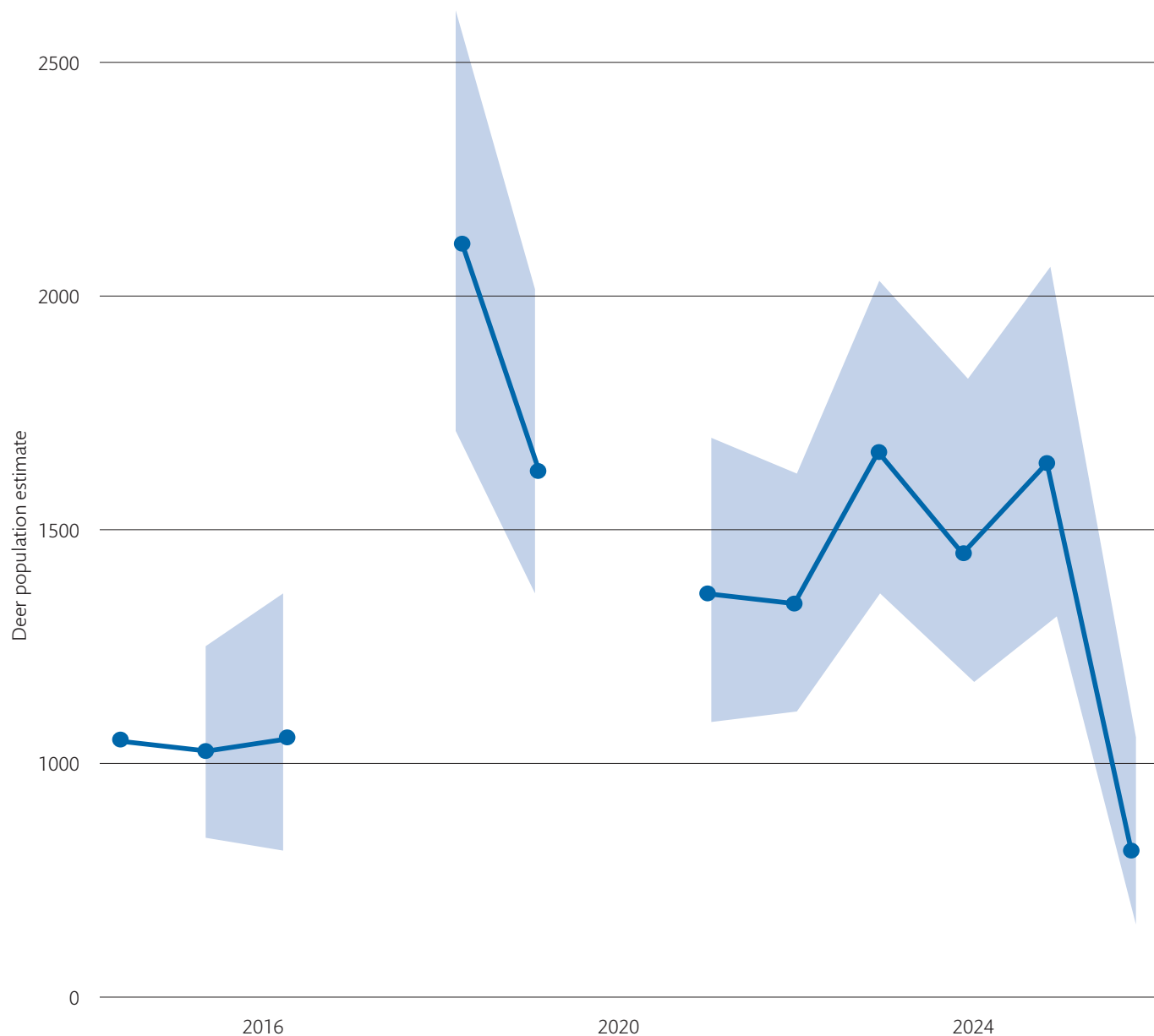


Figure 7 Modelled abundance with 95% confidence interval of feral wild boar within the Central and Periphery regions in 2026. Based on the output of the distance analysis.

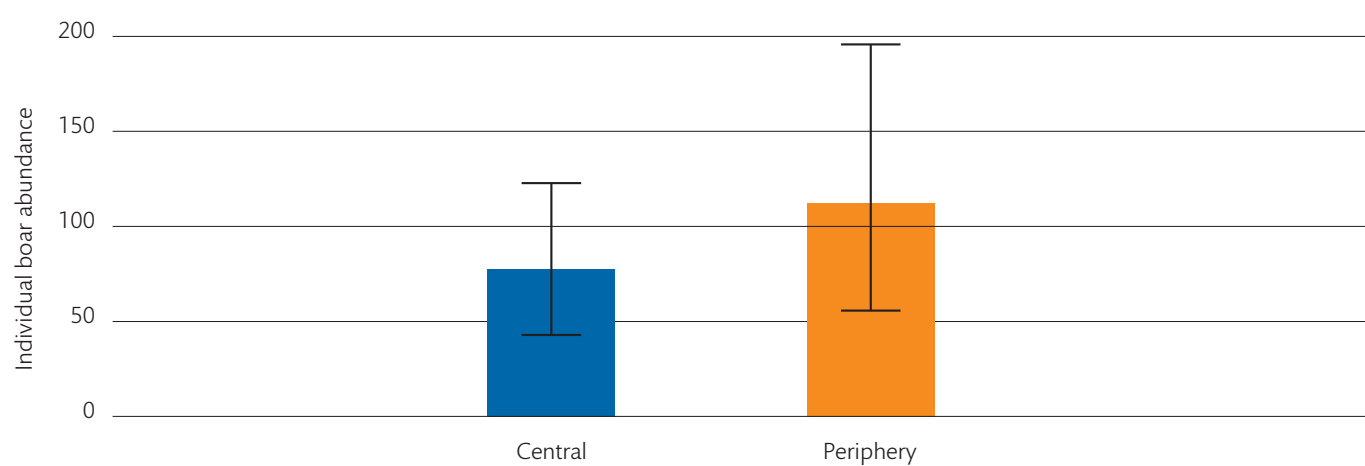
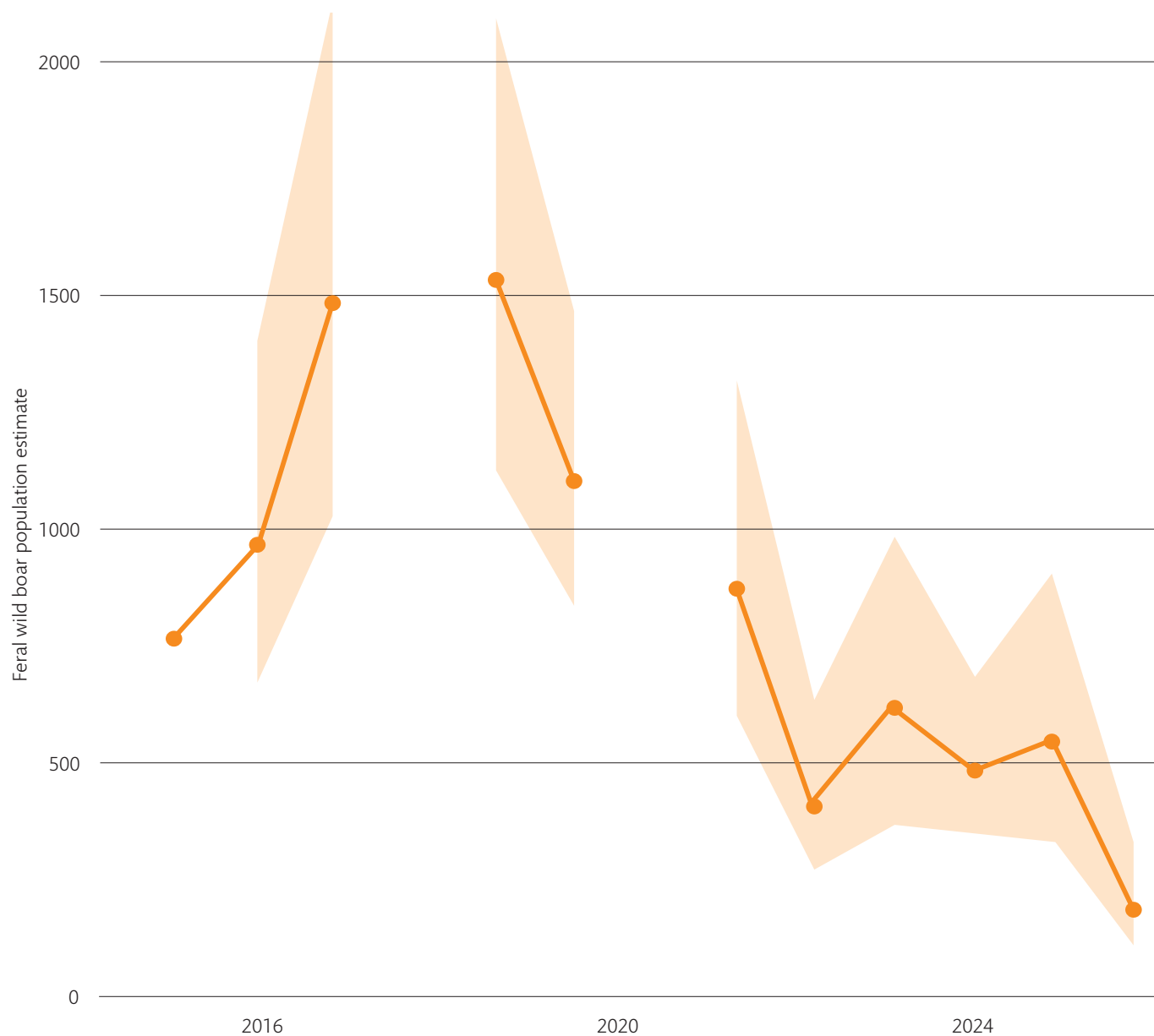


Figure 8 Estimated total feral wild boar population (solid line), with 95% confidence interval (shaded area) for the Forest of Dean based on the output of distance analyses for each year where survey data is available



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Populations of deer and feral wild boar throughout England are changing in response to changes in habitat, climate, and anthropogenic pressures. Monitoring changes in populations is important for ensuring effective population and woodland management. Following a standardised approach, we find an overall decline in the estimated population of deer and feral wild boar within the Public Forest Estate of the Forest of Dean when compared to previous years' surveys. We highlight the need to continue annual surveys to inform policy and management decisions and to monitor the effectiveness of previous management methods.