



Animal &
Plant Health
Agency

Livestock Demographic Data

Group:

Goat population report

**Livestock population density maps
for GB 2020 using winter 2018/19
data**



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APHA is an Executive Agency of the Department for Environment, Food and Rural Affairs and also works on behalf of the Scottish Government, Welsh Government and Food Standards Agency to safeguard animal and plant health for the benefit of people, the environment and the economy.

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Data source	Sheep and Goat Inventory / Rapid Analysis and Detection of Animal related Risk (RADAR) data warehouse
Data year	Winter 2018 / 2019 (Reported in December 2018 for England, and January 2019 for Scotland and Wales)

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Who are these reports for and what is their purpose?

These reports provide an estimate of the distribution and size of the goat population at GB level.

This type of population level information is often required for use in animal health and welfare policy work which requires to assess the economic or social impact of particular policies, for contingency, disease control and resource planning.

Who did this work?

The reports are produced by the Livestock Demographic Data Groups (LDDG). The LDDGs were formed in January 2014 and are made up of APHA representatives from data, epidemiology, species expert and GIS work groups.

What do the data show about the population?

The maps (Figures 1 and 2) show either the density of animals, with a small map to show how this compares with the density of holdings, or vice versa. The maps reflect the common understanding of the population, in comparison with previous years, and show that goat holdings in GB are diffusely spread across England and Wales with focal areas of greater goat holding density in the south-west, south-east and western parts of England and in south Wales. There are relatively few goat holdings in Scotland. There are a few focal areas of high goat population density in the south west, midlands and northern parts of England and these are likely to be relatively few, but very large dairy goat units, given the distribution of holding density. Outside of these focal areas the density is below one goat per km².

What do the data not show about the population?

The presentation of the data in the figures do not provide precise information on the variations in goat population density outside of the focal points, but this could be addressed with further refinement of mapping parameters.

How accurate are the data?

There are important assumptions and uncertainties with these estimates which the user needs to take into consideration. Limitations in the dataset are discussed in the supporting quality statement ([Annex 1](#)) and it is important that the user considers these in the context of their work. Population and holding density maps are classified to different scales and units from each other and due care must be taken regarding their interpretation.

The Sheep and Goat Inventory (Data from December 2018 for England and January 2019 for Wales and Scotland) holds information about the location and numbers of animals of goat holdings in GB. All the data described in the quality statement has been represented by Figures 1 and 2.

The data are derived from the approximately 72% of all registered sheep and goat holdings in Scotland and 82% in England and Wales that returned responses to the inventory survey. The characteristics of the non-responders are unknown and the effect of these missing data has not been evaluated. It is not expected that the fact that England's data is taken a month earlier (December) than Scotland and Wales (January) would have any effect on Figures 1 and 2. The supporting quality statement provides further detail on the limitations in the data ([Annex 1](#)).

How were the maps produced?

The maps have been created using the kernel density function in ArcGIS software. This tool distributes population information over a defined radius, creating a smooth density surface. Two key parameters that require adjustment are the search radius distance (15km radius for the maps presented within this report) and the size of the output surface grid. Discussion at the LDDG meetings informed these criteria, and their selection is recognised as a subjective process (Pfeiffer et al., 2008). A search radius of 15km was deemed sufficient to enable distinction between categories and a 1km grid square was used for the density surfaces themselves. The classification bins were limited to six, to aide in cross referencing areas of the map to the key.

Comparison between the maps was optimised by assigning similar parameters between the species. However, further refinement of the parameters for each dataset could represent the information more accurately. Note that the ArcGIS Kernel Density tool does not take into account edge effects, and as such density estimates in and around coastal areas may be under estimated (Charpentier & Gallic, 2016).

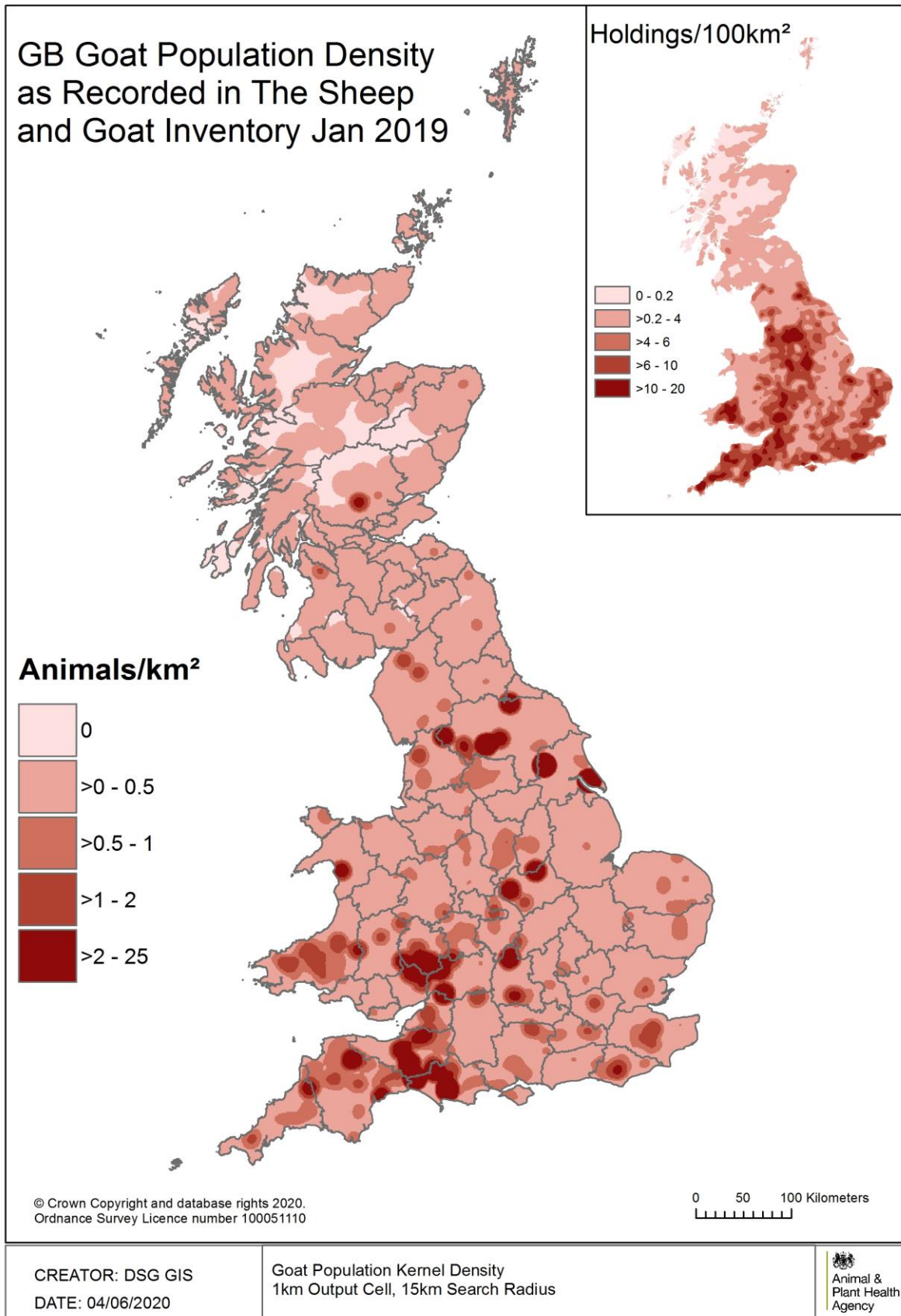


Figure 1 Goat population density in GB (Sheep and Goat Inventory)

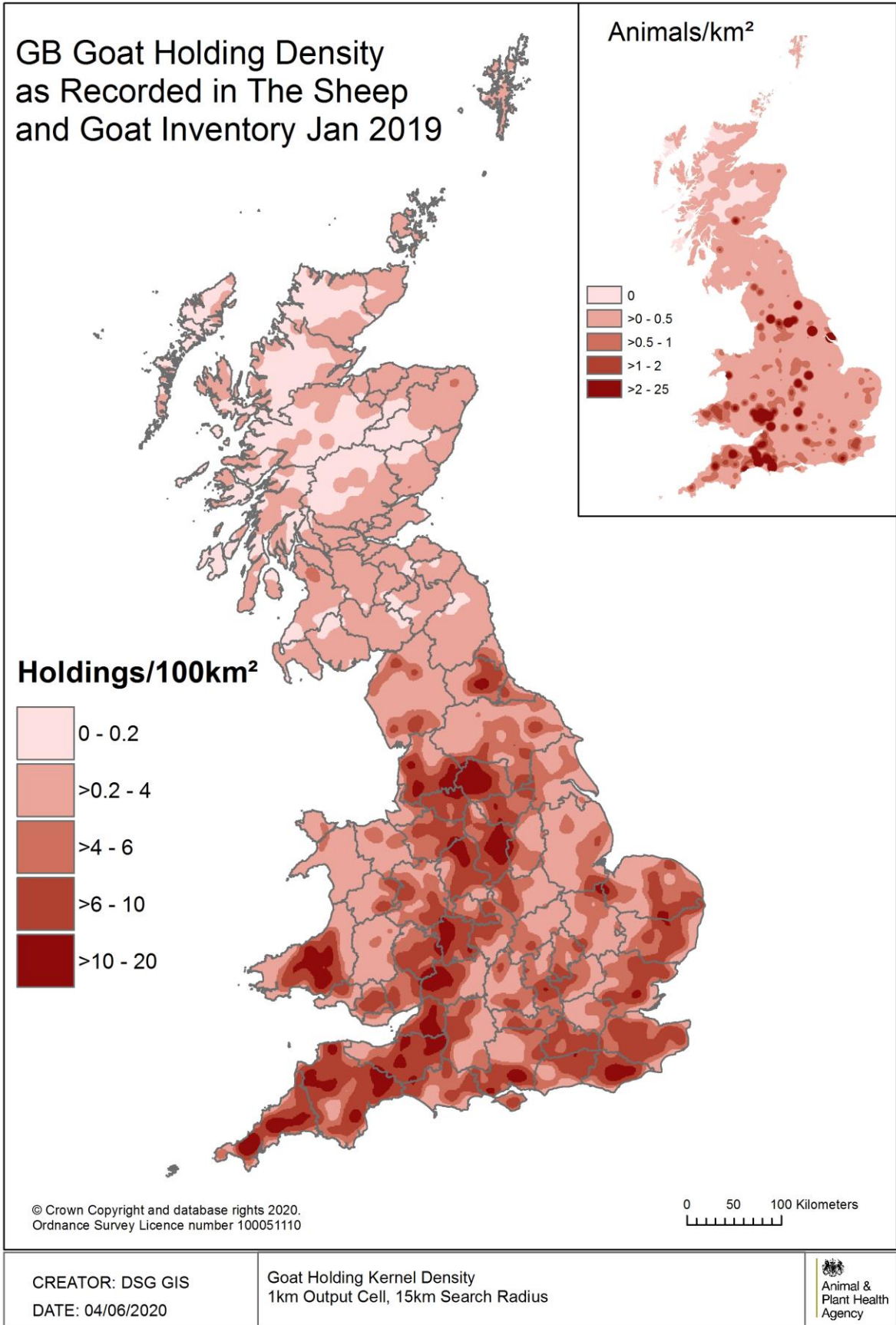


Figure 2 : Goat holding density in GB (Sheep and Goat Inventory)

Acknowledgements

The LDDG are grateful to Defra, Welsh Government, Scottish Government, IBM and APHA Weybridge DSG staff who handle the Sheep and Goat Inventory data and Rapid Analysis and Detection of Animal Related Risks (RADAR) data warehouse for their assistance in producing this report.

References

- Charpentier, A., & Gallic, E. (2016). Kernel density estimation based on Ripley's correction. *Geoinformatica*, 20(1), 95–116. <https://doi.org/10.1007/s10707-015-0232-z>
- Pfeiffer, D. U., Robinson, T. P., Stevenson, M., Stevens, K. B., Rogers, D. J., & Clements, A. C. A. (2008). *Spatial Analysis in Epidemiology* (1st ed.). Oxford University Press.

Annex 1: Data quality statement for goats (October 2020)

Introduction

This data quality statement provides an overview of the quality of the data used to underpin the kernel density holding and livestock maps. This statement is written in the context of the data being used to provide an overview of the livestock demographics within Great Britain. The statement may not necessarily relate to data quality for other purposes.

Overview and purpose of source data used

Data were supplied by the Data Systems Group (DSG), APHA Weybridge and sourced from the Sheep and Goat Inventory via the Rapid Analysis and Detection of Animal-related Risks (RADAR) data warehouse.

Sheep and Goat inventory (via RADAR) was chosen to represent the goat data as this has the most inclusive coverage on holdings across GB. This dataset records the number of sheep and goats kept on all registered individual premises and the purpose they are kept for e.g. meat, wool, dairy etc. The inventory data is collected once a year (1st December for England and 1st January for Scotland and Wales) by means of questionnaire cards which are sent to every registered goats holding in GB. This gives a winter count of the population. There is a response rate of between 72% (for Scotland) and 82% (for England and Wales) for each annual survey.

Category <i>[definition]</i>	Quality description
Relevance of data <i>[degree to which data meets user needs in terms of currency, geographical coverage, content and detail]</i>	Spatial coverage: The data cover GB (England, Scotland and Wales). Temporal coverage: The data presented are for December 1 st 2018 (England) and January 1 st 2019 (Scotland and Wales). The data were accessed in December 2019. Key data items available: The dataset includes species (sheep or goat) and number of animals on holding, purpose of holding, CPH, name and address of keeper/holding.
Timeliness	How often are the data collected? The data are collected annually on December 1 st for England and January 1 st for Scotland

<p><i>[the degree to which data represent reality from the required time point]</i></p>	<p>and Wales.</p> <p>When does the data become available? The data are available and uploaded into RADAR about 6 months after the survey is collected by the Defra Statistics Team based in York.</p> <p>Data reference period: The data are a snapshot at the date of the survey.</p> <p>How often are the data updated? Data are updated annually.</p>
<p>Accuracy and precision</p> <p><i>[extent of data error and bias and how well data portrays reality]</i></p>	<p>How were the data collected? Inventory cards are sent once a year by post to all holdings that have registered as keeping sheep or goats and asked to be completed and returned.</p> <p>Sample & collection size: All holdings registered as keeping sheep or goats are sent a form and is intended as a full census. It is not known how many eligible holdings have not registered. The sample consists of all the holdings that have returned the inventory form.</p> <p>Further information on rules for registering a holding where sheep and goats are kept:</p> <p>https://www.gov.uk/sheep-and-goats-identification-registration-and-movement</p> <p>What steps have been taken to minimise processing errors? Further investigation is required to identify what work has been done to review the accuracy of the data in Wales and Scotland. The data collected through the survey in England is subject to manual validation to check the data accuracy. Not all data that fails validation can be corrected/confirmed as the survey team cannot always get hold of the keeper. There are a number of different errors that can be detected such as incorrect flock number, illegible forms, etc. The team check every form and verify the information where possible.</p> <p>What are the response rates? Response rates for surveys between 2017 and 2018 are estimated to be 72-82%.</p> <p>Are any parts of the population unaccounted for in the data collection? The Defra Statistics Team do not receive returns from around 18% and 22% of holdings surveyed, from England/Wales and Scotland respectively. However, it is not known whether non-responders represent particular parts of the population. There may also be holdings that are not registered, and so are unknown,</p>

	<p>which is something that will be investigated further.</p> <p>There is guidance on how to register your holding and flock or herd at: https://www.gov.uk/guidance/sheep-and-goat-keepers-register-your-holding-and-flock-or-herd</p> <p>More information on how to keep and update a holding register in the annual sheep and goat inventory at: https://www.gov.uk/guidance/sheep-and-goat-keepers-how-to-keep-a-holding-register</p>
<p>Comparability</p> <p><i>[how well these data can be compared with data taken from the same dataset and with similar data from other sources]</i></p>	<p>Within dataset comparability: The format and survey methods are similar between years.</p> <p>Other dataset comparability: The data compares with the Agricultural Survey, which shows data collected in the summer. Animal Movement Licensing System (AMLS) holds movement data, which can compare knowledge of holding locations and relative sizes. However, both datasets have a difference in data capture, as does data held within Sam; work is ongoing to further investigate the comparability of these datasets.</p>
<p>Coherence</p> <p><i>[degree to which data can be or have been merged with other data sources]</i></p>	<p>How consistent are the data over time? If there are differences, what are they and what is their impact? Have there been changes to the underlying data collection? It appears data collection procedures have changed over the past years in Wales, with farmers reporting different holdings in one form. Therefore, several holdings may be recorded as one holding. Apart from this, we are unaware of any changes to the data collection that could potentially impact the representativeness of the dataset.</p> <p>Have any real world events impacted on the data since the previous release? Delays in the production and publication of this report as a result of Covid-19.</p> <p>What other data sources are these data comparable with? Location data are comparable between the Agricultural survey, Sam and the Animal Movement Licensing System (AMLS). The Agricultural survey data has been used for total population and the AMLS for total holdings.</p> <p>What other data sources in society report similar information? How do these data sources compare? Industry has their own datasets but these are obtained from, for example, the sheep and goat inventory and Agricultural Survey. It is thought they are</p>

	unlikely to offer any additional information.
<p>Interpretability</p> <p><i>[how well the data is understood and utilised appropriately]</i></p>	<p>Is there a particular context that this data needs to be considered within? The small ruminant expert group advises that seasonality in the goat population is minimal so the values provided should be stable through the year.</p> <p>What other information is available to help users better understand this data source? There is a metadata catalogue for RADAR available at http://ahvlaintranet/day-to-day/tools-and-applications/Pages/radar.aspx</p> <p>Are there any ambiguous or technical terms that may need further explanation? No.</p>
<p>Accessibility</p> <p><i>[availability of relevant information and access to the data in a convenient and suitable manner]</i></p>	<p>What data are shared and with whom? Addresses and coordinates of individual locations cannot be released without Confidentiality Agreements. DSG access data through RADAR or directly from York Stats.</p> <p>Contact details for data source queries:</p> <p>Agricultural Survey England: Farming-statistics@defra.gov.uk</p> <p>Agricultural Survey Wales: Stats.agric@wales.gov.uk</p> <p>Agricultural Survey Scotland: agric.stats@scotland.gov.uk</p> <p>ScotEID Livestock Traceability - support@scoteid.com</p> <p>Freedom of Information (FOI), Environmental Information Regulations (EIR) and Subject Access requests - enquiries@apha.gov.uk</p>