European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the conservation status assessment for the species:

S1341 - Common dormouse (*Muscardinus avellanarius*)

ENGLAND

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this species is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).
- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (England information only)**
1.2 Species code	**1341**
1.3 Species scientific name	**Muscardinus avellanarius**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Common dormouse

2. Maps

2.1 Sensitive species	No
2.2 Year or period	1995-2016
2.3 Distribution map	Yes
2.4 Distribution map Method used	Complete survey or a statistically robust estimate
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?	No	
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

Goodwin, C. E. D., Hodgson, D. J., Al-Fulaij, N., Bailey, S., Langton, S. & McDonald, R. A. (2017). Voluntary recording scheme reveals ongoing decline in the United Kingdom hazel dormouse Muscardinus avellanarius population. Mammal Review, 47, 183-197.
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Mathews, F., Kubasiewicz, L.M., Gurnell, J., Harrower, C., McDonald, R.A., Shore, R.F (2018). A review of the population and conservation status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage.
Forestry Commission (2016). 50-year forecast of softwood timber availability Forestry Commission (2017) Forestry Statistics.
Kirby KJ, Reid CM, Thomas RC and Goldsmith FB (1998) Preliminary estimates of fallen deadwood and standing trees in managed and unmanaged forests in Britain. Journal of Applied Ecology 35: 148-155.
Bright, P., Morris, P. & Mitchell-Jones, A. J. (2006). The dormouse conservation handbook, English Nature.
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Chanin, P. & Woods, M. J. (2003). Surveying dormice using nest tubes: results and experiences from the South West Dormouse Project. English Nature.
Bright, P. W., Mitchell, P. & Morris, P. A. (1994). Dormouse distribution: survey techniques, insular ecology and selection of sites for conservation. Journal of

Applied Ecology, 31, 329-339.
Bright, P. & MacPherson, D. (2002). Hedgerow management, dormice and biodiversity. English Nature.
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Juskaitis, R. & Siozinyte, V. (2008). Habitat requirements of the common dormouse (Muscardinaus avellanarius) and the fat dormouse (Glis glis) in mature mixed forest in Lithuania. Ekologia 27: 143-151.
Berg, L. (1996). Small-scale changes in the distribution of the dormouse Muscadinus avellanarius in relation to vegetation changes. Mammalia 60: 211-216.
Sozio, G., Iannarilli, F., Melcore, I., Boschetti, M., Fipaldine, D., Luciani, M., Roviani, D., Schiavano, A., Mortelliti, A. (2016). Forest management affects individual and population parameters of the hazel dormouse, Muscardinus avellanarius. Mammalian Biology 81: 96-103.
Mortelliti, A., Amori, G., Capizzi, D., Cervone, C., Fagiani, S., Pollini, B., Boitani, I. (2011). Independent effects of habitat loss, habitat fragmentation and structural connectivity on the distribution of two arboreal rodents. Journal of Applied Ecology 48: 153-162.
Mortelliti, A., Sozio, G., Driscoll, D., Bani, I., Boitani, I., Lindenmayer, D. (2014). Population and individual-scale responses to patch size, isolation and quality in the hazel dormouse. Ecosphere 5: 1-21.
Wuttke, N., Buchner, S., Roth, M., Bohme, W. (2012). Habitat factors influencing the distribution of the hazel dormouse (Muscadinus avellanarius) in the Ore Mountains, Saxony, Germany. Peckiana 8: 21-30.
Wembridge, D., Al-Fulaij, N., Langton, S. (2017). The state of Britain's Dormice 2016. People's Trust for Endangered Species.

5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Stable (0)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²)	67601
	b) Operator	
	c) Unknown	
	d) Method	The favourable reference range has been taken from Mathews et al (2018), whereby an alpha hull value of 20km was drawn around the presence records, which represented the best balance between the inclusion of unoccupied sites (i.e. where records are sparse but close enough for inclusion) and the exclusion of occupied areas due to gaps in the data (i.e. where records exist but are

too isolated for inclusion). An additional 10km buffer was added to the final hull polygon to provide smoothing to the hull and to ensure that the hull covered the areas recorded rather than intersecting them. This differs from the approach taken in 2013 and 2007 whereby a 45km alpha hull value was used for all species with a starting range unit of individual 10km squares. The new method has led to much finer detail maps being produced underpinned by data gathered at a much finer resolution, leading to the production of a more accurate FRR.

5.11 Change and reason for change in surface area of range	Improved knowledge/more accurate data Use of different method	
	The change is mainly due to:	Use of different method
5.12 Additional information	Range is based on presence data collected between 1995-2016. The GB range (country-level ranges were not provided for this species and cannot be compared) is slightly smaller than that given in the 2013 Article 17 report; this difference is likely to reflect the use of different methodology.	

6. Population

6.1 Year or period	1995-2016	
6.2 Population size (in reporting unit)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	4169
6.3 Type of estimate	Best estimate	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of individuals (i)
	b) Minimum	298000
	c) Maximum	2110000
	d) Best single value	
6.5 Type of estimate	95% confidence interval	
6.6 Population size Method used	Based mainly on extrapolation from a limited amount of data	
6.7 Short-term trend Period	2005-2014	
6.8 Short-term trend Direction	Decreasing (-)	
6.9 Short-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
6.10 Short-term trend Method used	Complete survey or a statistically robust estimate	
6.11 Long-term trend Period	1993-2014	
6.12 Long-term trend Direction	Decreasing (-)	

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6.13 Long-term trend Magnitude	a) Minimum	0.72
	b) Maximum	0.72
	c) Confidence interval	95
6.14 Long-term trend Method used	Complete survey or a statistically robust estimate	
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size	
	b) Operator	
	c) Unknown	x
	d) Method	The favourable reference population for this species is unknown. The current population estimate has extremely wide confidence limits due to data deficiencies around habitat density estimates and, although it is known that there have been large and sustained population declines, it is not possible to produce a favourable reference value for population.
6.16 Change and reason for change in population size	Genuine change Improved knowledge/more accurate data Use of different method	
	The change is mainly due to:	Genuine change
6.17 Additional information	Genuine change (Goodwin et al, 2017) and change in the methodology used to calculate population size (Mathews et al, 2018). Comparison of population estimates between the current reporting round and previous reporting round (England: 2013=37,500 individuals; 2018=757,000 individuals; UK: 2013=45,000 individuals; 2018=930,000) suggests a significant increase in population size. However, the 2013 estimate originates from a pers com in Battersby 2005. The 2018 estimate (Mathews et al 2018) has been calculated using more robust methods, although does still have a low reliability estimate (see 6.4 species audit). These population size estimates cannot therefore be relied upon to determine trend in population size. However, the the National Dormouse Monitoring Programme provides a statistically robust estimate of population trends and shows a significant population decline as reported in 6.9 and 6.13 (Goodwin et al 2017).	

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	Unknown
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Unknown
7.2 Sufficiency of area and quality of occupied habitat Method used	Insufficient or no data available	
7.3 Short-term trend Period	2005-2014	
7.4 Short-term trend Direction	Unknown (x)	
7.5 Short-term trend Method used	Insufficient or no data available	
7.6 Long-term trend Period		

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7.7 Long-term trend Direction

7.8 Long-term trend Method used

7.9 Additional information

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	H
Abandonment of traditional forest management (B04)	H
Invasive alien species of Union concern (I01)	H
Problematic native species (I04)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (F01)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Clear-cutting, removal of all trees (B09)	H
Increases or changes in precipitation due to climate change (N03)	M
Desynchronisation of biological / ecological processes due to climate change (N06)	M

Threat	Ranking
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	H
Abandonment of traditional forest management (B04)	H
Invasive alien species of Union concern (I01)	H
Problematic native species (I04)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (F01)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Clear-cutting, removal of all trees (B09)	H
Increases or changes in precipitation due to climate change (N03)	M
Desynchronisation of biological / ecological processes due to climate change (N06)	M

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8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken
9.2 Main purpose of the measures taken		Maintain the current range, population and/or habitat for the species
9.3 Location of the measures taken		Both inside and outside Natura 2000
9.4 Response to the measures		Medium-term results (within the next two reporting periods, 2019-2030)

9.5 List of main conservation measures

Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land (CA01)
Restore small landscape features on agricultural land (CA02)
Maintain existing traditional forest management and exploitation practices (CB02)
Adapt/manage reforestation and forest regeneration (CB04)
Other measures related to forestry practices (CB15)
Reduce impact of transport operation and infrastructure (CE01)
Manage conversion of land for construction and development of infrastructure (CF01)
Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities (CF02)
Manage other native species (CS04)
Reintroduce species from the directives (CS02)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species	
10.2 Additional information		Declines in M. avellanarius appear to be ongoing and there was a decline of 47% (95% confidence limits: 39-55% decline) between 2005 and 2014. The dormouse poulation appears to have been in decline since the inception of the National Dormouse Monitoring Programme (Goodwin et al, 2017). Given that conservation measures have already been in place during this time and there has been a continued a decline, the future prospects are thought to be negative. Although a remnant population in Northumberland appears to have been lost since 2010, the future prospects for range are thought to be stable. Future prospects for habitat are thought to be negative. The rate of woodland planting has declined in the past 20 years and although there has been increased interest in afforestation, this is not likely to balance the loss of woodland to other land uses (Forestry Commission, 2017; Forestry Commission, 2016). Some of the key threats to semi-natural woodland are overgrazing, habitat fragmentation and

isolation, invasion by non-native species, unsympathetic forestry practices, lack of appropriate management, air pollution and new pests and diseases. A reduction in traditional coppice management has resulted in increased shadiness, reductions in understorey and open space, and increases in deadwood (Kirby et al. 1998). Substantial declines (26%) in ancient woodland indicator species between 1998 and 2007 in GB (Carey et al. 2008), indicative of declining woodland quality. However, roadside plantings have increased available habitat in some areas, as well as promoting connectivity. Climate change is also likely to have an effect on the species, with the potential for both positive and negative effects (Mathews et al, 2018).

11. Conclusions

11.1. Range	
11.2. Population	
11.3. Habitat for the species	
11.4. Future prospects	
11.5 Overall assessment of Conservation Status	
11.6 Overall trend in Conservation Status	
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit b) Minimum c) Maximum d) Best single value
12.2 Type of estimate	
12.3 Population size inside the network Method used	
12.4 Short-term trend of population size within the network Direction	
12.5 Short-term trend of population size within the network Method used	
12.6 Additional information	

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13. Complementary information

13.1 Justification of % thresholds for trends

13.2 Trans-boundary assessment

13.3 Other relevant Information

Distribution Map

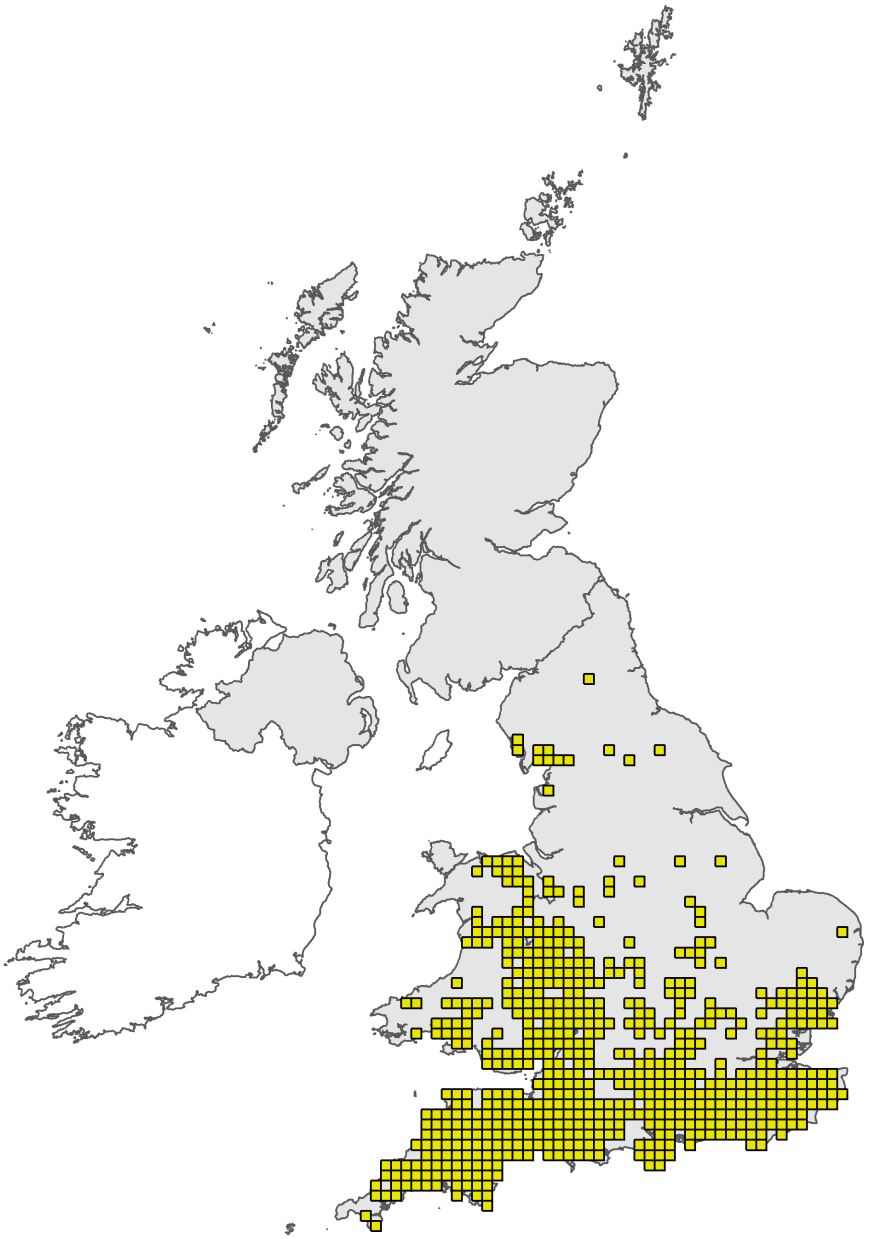

Figure 1: UK distribution map for S1341 - Common dormouse (*Muscardinus avellanarius*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

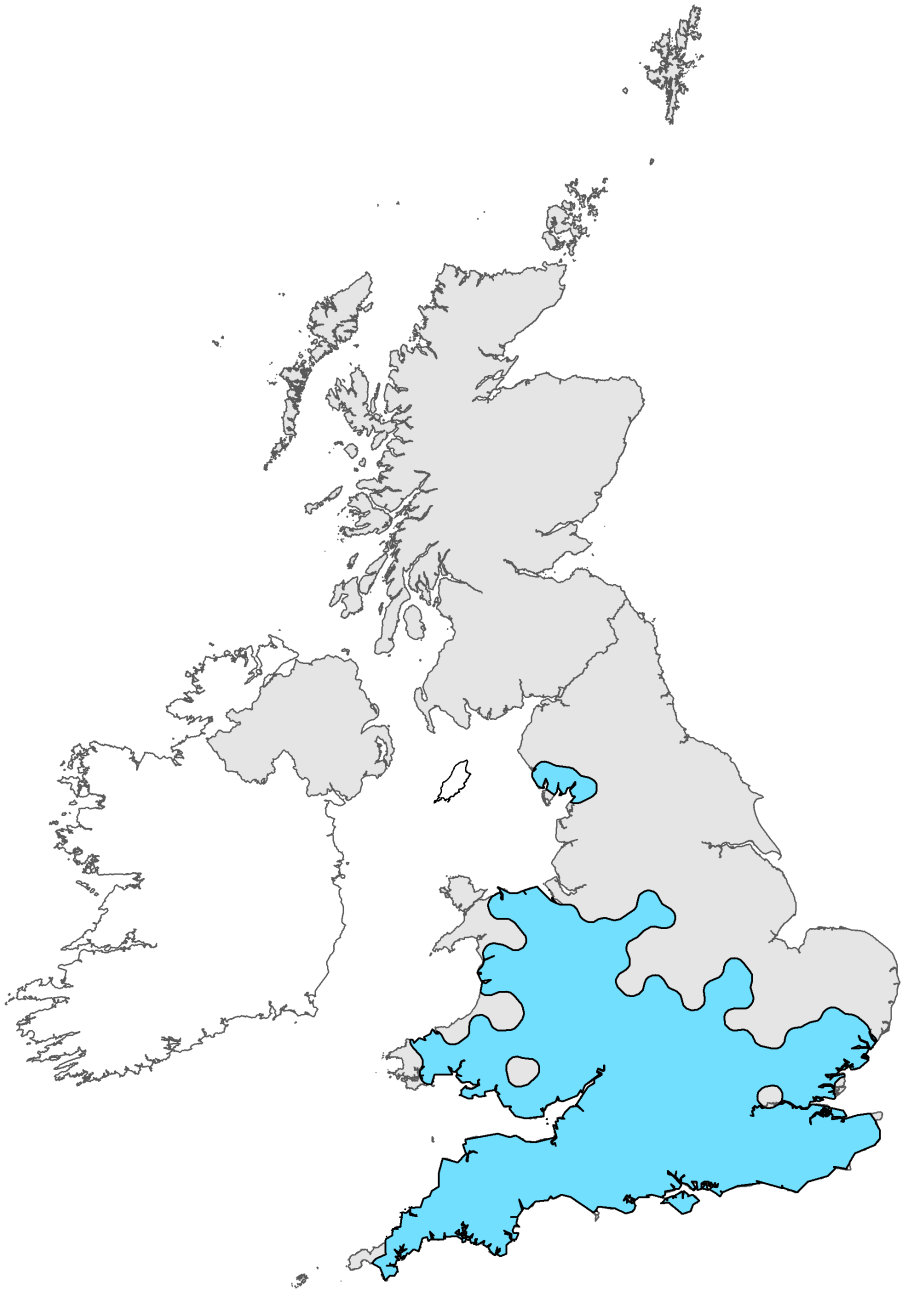

Figure 2: UK range map for S1341 - Common dormouse (*Muscardinus avellanarius*).Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by The Mammal Society applying a range mapping tool as outlined in Matthews et al. (2018), to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 20km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Muscardinus avellanarius (1341)

Field label	Note
1.5 Common name	The common or hazel dormouse (Muscardinus avellanarius) can be found primarily in broadleaved woodland and has traditionally been associated with early sucessional woodland, as well as coppice (Bright & Mitchell-Jones, 2006; Juskaitis & Buchner, 2013). However, more recent studies have shown that the species also occurs in other habitat types, such as scrub, coniferous plantations and hedges (Chanin & Woods, 2003). The species is now seen to more adaptable than once thought. Studies on this species have shown that M. avellanarius exploits a wide range of food sources, including high quality plant foods such as flowers, buds, seeds and fruits, as well as invertebrates, particularly in habitats where species diversity is lower (Juskaitis & Buchner, 2013).

Species name: Muscardinus avellanarius (1341) Region code: ATL

Field label	Note
6.3 Type of estimate	Time period in 6.1 reflects the range of records used for 1km square count, but more than 97% of the records are from 2011 or later. The number of 1km squares recorded here is for both England and Wales.
6.4 Additional population size	Mathews et al, (2018) gives estimates of 298,000 individuals (lower plausible limit) to 2,110,000 (upper plausible limit) in England, with a main estimate of 757,000. The overall estimate was based on information on percentage occupancy from Bright et al (1994) as the percentage of sites surveyed that contained signs of dormice in the form of gnawed nuts. Survey sites were stratified by age, area and isolation and were selected at random, but survey areas within these woodlands were only surveyed where hazel scrub was heavily fruiting to maximise the probability of detecting dormice and reduce the risk of false negatives. Percentage occupancy for hedgerows was taken from Bright & MacPherson (2002), where occupancy as measured from hedgerows in 50 sample sites. These population estimates were calculated based on the length and width of hedgerows and presented as hectares, but these figures were converted to the number of M. avellanarius per km, assuming each hedgerow had an average width of 3m. Population estimates by Mathews et al (2018) were obtained by multiplying habitat-specific density estimates by the extent of these habitats within the geographical range. Where multiple estimates were available, the median value was used to produce the 'best' estimate, and 95% confidence intervals were created. Where possible, population sizes were adjusted to account for the percentage of occupied habitat within the species' range. Occupancy data were only included where studies used standardised surveys and reported both presence and absence. In the absence of data on percentage occupancy, 100% was assumed. The possibility of dormice living in a wider range of habitats was not considered. As recent research suggests that the species are less specialised than previously thought (Juskaitis & Buchner, 2013), percentage occupancy used in this estimate may not be representative of all habitats within the species' range. The estimates may be an underestimate. Conversely, permanent populations are unlikely to be found in small woodlands (under 20ha) and these small woodlands make up a large proportion of woodlands within the range. Further research on density estimates is required to improve the reliability of population size estimates for this species (Mathews et al, 2018). Reliability scores for the habitat density estimates were assigned to give an indication of the reliability of the data underpinning the population estimate. The habitat density estimates and occupancy data used for the dormouse population estimate were given a reliability score of 2 from a maximum of 5.

6.9 Short term trend; Magnitude	Annual mean rate of decline not available for 2005-2014, but Goodwin et. (2017) state that the England and Wales decline between 1993-2014 of 72% (95% confidence limits: 62-79% decline) is equivalent to annual mean rate of decline of 5.8% (95% confidence limits: 4.5-7.1% decline).
6.10 Short term trend; Method used	The National Dormouse Monitoring Programme has assessed trends in relative population size through counts of nestbox occupancy in selected sites since 1993. This analysis (of English and Welsh data) has shown a steady and continuing decline in occurance, with the decline from 2005 to 2014 being estimated to be 47% (95% confidence limits: 39% - 55%), and a more marked decline in eastern than western areas (Goodwin et al, 2017; Mathews et al, 2018). Inferences about decline in the population are made on the assumption that fewer dormice using nest boxes equates to fewer dormice in the population, but it is possible that dormice may use boxes less frequently if the habitat has improved at that site and more natural nesting sites are available (Mathews et al, 2018). However, there is evidence that the dormice found in trapping studies are also found in nest boxes if studies are carried out over several years, which supports the use of nest box monitoring to indicate population size for long-term studies of the species (Goodwin et al, 2017).
6.13 Long term trend; Magnitude	This data is for both England and Wales and has been taken from Goodwin et al (2017). Goodwin et al (2017) state that the England and Wales decline between 1993 - 2014 of 72% (95% confidence limits: 62-79%) is equivilent to annual mean rate of decline of 5.8% (95% confidence limits: 4.5% - 7.1% decline).
7.4 Short term trend; Direction	The National Dormouse Monitoring Programme has shown a continuing decline in the hazel dormouse population. One of the potential reasons for this decline is habitat loss and change, but the short-term trend for habitat is unknown as there is insufficient data. M. avellanarius are generally associated with early to mid-successional woodland habitats (including hazel coppice, PAWS, hedgerows, scrub and some conifer woodlands), with structural diversity and a well-developed understory being important factors (Bright & Morris, 1990; Juskaitis & Siozinyte, 2008; Juskaitis et al, 2013; Goodwin et al, 2017). A change in the quality or availability of this habitat type would likely result in a change in the dormouse population (Bright & Morris, 1990; Berg, 1990; Sozio et al, 2016). The structure of the landscape has been shown to have an impact on the occurance of dormice, with decreased connectivity across the landscape reducing the ability of dormice to re-colonise and making smaller fragments of woodland less viable in the long-term (Bright et al, 1994; Mortelliti et al, 2011; Mortelliti et al, 2014; Wuttke et al, 2012; Goodwin et al, 2017). The rate of woodland planting has declined in the past 20 years and although there has been increased interest in afforestation, this is not likely to balance the loss of woodland to other land uses and these ne areas of woodland may be of low suitability for dormice (Forestry Commission, 2017; Forestry Commission, 2016). Some of the key threats to semi-natural woodland are overgrazing, habitat fragmentation and isolation, invasion by non-native species, unsympathetic forestry practices, lack of appropriate management, air pollution and new pests and diseases. A reduction in traditional coppice management has resulted in increased shadiness, reductions in understorey and open space, and increases in deadwood (Kirby et al. 1998). Substantial declines (26%) in ancient woodland indicator species between 1998 and 2007 in GB (Carey et al. 2008), are indicative of declining woodland quality. However, roadside plantings have increased available habitat in some areas, as well as promoting connectivity. Although we know there have been changes in habitat quantity and quality, there is insufficient information to assess the current short-term trend.

8.1 Characterisation of pressures/ threats	M. avellanarius has traditionally been associated with early sucessional woodland, as well as coppice (Bright & Mitchell-Jones, 2006; Juskaitis & Buchner, 2013). However, more recent studies have shown that the species also occurs in other habitat types, such as scrub, coniferous plantations and hedges (Chanin & Woods, 2003). High species diversity and a dense shrub layer are both considered important in maintaining this species and there is increasing evidence that rising deer populations are having a negative impact on the structure of the understorey (Newson et al, 2011). Similarly, a lack of woodland management, allowing woodland to progress towards a closed-canopy high forest, as well as loss of woodland cover and the removal of hedgerows are considered to be important pressures on dormouse populations (Bright et al, 2006; Wembridge et al, 2017). The continued development of infrastructure is also likely to have an impact on dormice through habitat loss and fragmentation.
9.5 List of main conservation measures	Priority conservation measures include: encouraging appropriate habitat management (of woodlands and of hedgerow connectivity) including protecting, maintaining and enhancing current habitat by planting and retaining woodland edge, dense shrubbery and overgrown clearings; offering advice on management to woodland managers; promotion of better consideration by Highways Agency and Local planning authorities when considering development or road proposals to ensure fragmentation of populations does not occur; carrying out reintroductions in locations where the species has been lost; encouraging the management of deer populations and managing grazing of other animals (i.e. farm stock) in woodlands; and continuing to investigate the impacts of climate change, the impacts of other species, habitat fragmentation, woodland management regimes etc.