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:

S1083 - Stag beetle (*Lucanus cervus*)

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	**1083**
1.3 Species scientific name	**Lucanus cervus**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Stag beetle

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2013-2018
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

Fremlin, M. 2013. Results of the 'Stag Beetle 'larval incidents' in private gardens' survey, Essex Naturalist (New Series) 30, 94-108.
People's Trust for Endangered Species Great Stag Hunt dataset: 1998-2017.
HARVEY DJ and GANGE AC (2011) The stag beetle: a collaborative conservation study across Europe, Insect Conservation and Diversity (2011) 4, 2-3.
Hawes, C, (2009) Radio-telemetric monitoring of stag beetles Lucanus cervus at two sites in the United Kingdom: limited dispersal and its implications for conservation, in 2nd meeting of the European Stag Beetle Group December 5th 2009, Leiden, http://www.repository.naturalis.nl/document/157904.
Rink M, and Sinsch U, (2007) Radio-telemetric monitoring of dispersing stag beetles: implications for conservation, Journal of Zoology, Volume 272, Issue 3, pages 235-243, July 2007.
London Wildlife Trust (2011) Staggering Gains: Report of the 2011 survey of stag beetle in Greater London.
http://www.wildlondon.org.uk/stag-beetle-survey-2011-12
Percy. C et al (1999) Findings of the 1998 National Stag Beetle Survey. PTES.
https://ptes.org/wp-content/uploads/2014/06/Great-Stag-Hunt-1998.pdf
Lane & Mann (2016) A review of the status of the beetles of Great Britain The stag beetles, dor beetles, dung beetles, chafers and their allies - Lucanidae, Geotrupidae, Trogidae and Scarabaeidae. Species Status No.31. Natural England.

5. Range

5.1 Surface area (km²)

5.2 Short-term trend Period

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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) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	No change The change is mainly due to:	
5.12 Additional information		

6. Population

6.1 Year or period	2013-2018	
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	3500
6.3 Type of estimate	Minimum	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of map 10x10 km grid cells (grids10x10)
	b) Minimum	
	c) Maximum	
	d) Best single value	291
6.5 Type of estimate	Minimum	
6.6 Population size Method used	Complete survey or a statistically robust estimate	
6.7 Short-term trend Period	2007-2018	
6.8 Short-term trend Direction	Stable (0)	
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	1994-2018	
6.12 Long-term trend Direction	Increasing (+)	

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6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	28
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 d) Method	
6.16 Change and reason for change in population size	No change The change is mainly due to:	
6.17 Additional information		

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)?	Yes
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on extrapolation from a limited amount of data	
7.3 Short-term trend Period	2007-2017	
7.4 Short-term trend Direction	Stable (0)	
7.5 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data	
7.6 Long-term trend Period	1995-2018	
7.7 Long-term trend Direction	Uncertain (u)	
7.8 Long-term trend Method used	Based mainly on expert opinion with very limited data	
7.9 Additional information	The early northern English losses look real now, with no recent records being generated. Given the species rarity in the north and its size, this suggests genuine absence. However, it cannot be said that this is a consequence of habitat deterioration; it could equally well be a climate shift response.	

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (F02)	H
Removal of dead and dying trees, including debris (B07)	H

Threat	Ranking
Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (F02)	H

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Removal of dead and dying trees, including debris (B07) M

8.2 Sources of information	
8.3 Additional information	Tidiness in parks, gardens and even in the countryside threat to remove the important wood rot substrates for the larvae, whilst this resource is actively provided through the man-made infrastructure of fence posts and other wooden structures embedded in the ground. Renewal of this resource is, in the absence of guidance, a pressure of the localised population structure. An over-application of percieved safety risks on all decaying timber (as opposed to that that is a real risk), may operate in the parklands, commons and allotments.

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		Only 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		

Other measures related to residential, commercial, industrial and recreational infrastructures, operations and activities (CF12)

9.6 Additional information	Both the People's Trust for Endangered Species and the London Wildlife Trust have species information guides for stag beetle. These guides detail the beetle's ecology and habitat needs, and how house-holders can help stag beetles. There is need for greater understanding around the impacts of within and between garden translocations, as this seems to be common practice. The role losses of large garden in urban situations through related development also requires exploration.

10. Future prospects

10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species
10.2 Additional information	

11. Conclusions

11.1. Range
11.2. Population
11.3. Habitat for the species
11.4. Future prospects

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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	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	323
12.2 Type of estimate	Best estimate	
12.3 Population size inside the network Method used	Based mainly on extrapolation from a limited amount of data	
12.4 Short-term trend of population size within the network Direction	Stable (0)	
12.5 Short-term trend of population size within the network Method used	Based mainly on extrapolation from a limited amount of data	
12.6 Additional information		

13. Complementary information

13.1 Justification of % thresholds for trends	
13.2 Trans-boundary assessment	
13.3 Other relevant Information	

Distribution Map

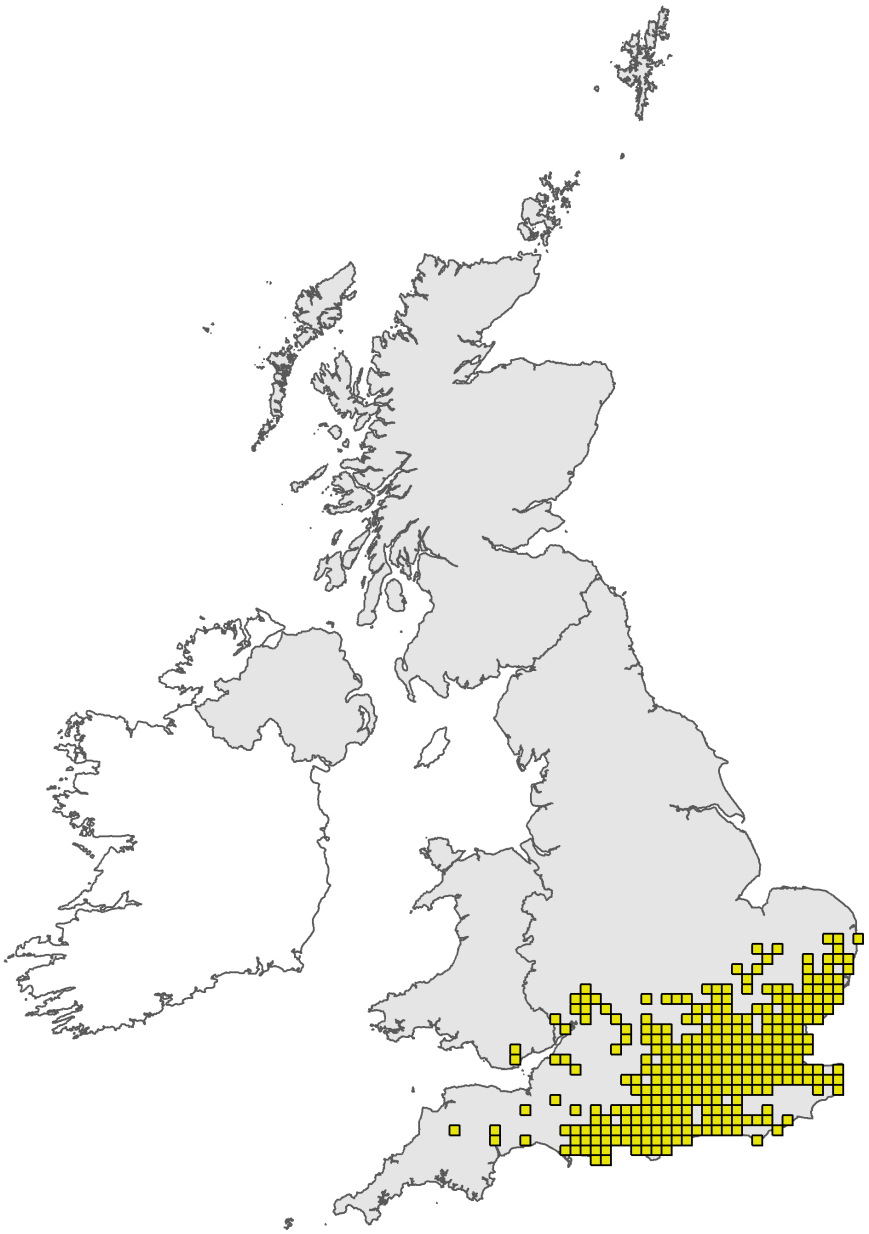

Figure 1: UK distribution map for S1083 - Stag beetle (*Lucanus cervus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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 S1083 - Stag beetle (*Lucanus cervus*). 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 applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) 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: Lucanus cervus (1083) Region code: ATL

Field label	Note
5.12 Additional information	Despite the fact that this species is recorded almost entriely through citizen science, driven by PTES and their website, there is remarkable range matching between the 3rd and 4th period reports. Given that the data is unguided, this suggests the species remains widespread and in enough numbers to be noticed by the public. When taking an even longer view, we can see range contraction as evidenced by the 1966 map data in Percy et al (1999), suggesting a range contraction from the north and northern Midlands of England, to the more southerly belt it has occupied. This may be a response to climate envelope, as this report suggests an intolerance of particularly wet conditions. However, with the period of the Article 17 reports, the range has been pretty much stable, notwithstanding the fact that the data is not guided but is as is. Given the previous rarity of the species in the northern areas, it is inconceivable that presence would not be recorded, suggesting these losses are real and not a data artifact.
6.3 Type of estimate	The PTES dataset for the 4th report period is comprised of 14,700 records sourced from the general public. The Greater London dataset was not accessed, but this will add new monads; as such, the stag betle data for the 4th period should be regarded as a minimum statement.
6.8 Short term trend; Direction	The higher hectad count of 293 is remarkably close to the 291 hectads from the current report, especially as the data collection is unguided. These data exclude the additional Greater london dataset, so it is likely that the hectad and monad counts will be higher than reported here. Nevertheless, stability is the key message coming through.
6.13 Long term trend; Magnitude	The hectad count between 1995-2018 = 357, with a monad count of 4311. The 28% increase is probably an artifact of use of the online recording platform and the media interest generating records, rather than a real increase.
7.1 Sufficiency of area and quality of occupied habitat	Fremlin (2013) in her survey of private gardens is SE England showed a larval dependency on garden stumps and logs, and fence posts and other wooden structures. The paper suggests that this species in England is synanthropic, which is not unreasonable for a large number of sub-populations. The paper notes a wide range of garden shrubs associated with the larvae.
7.9 Additional information	The detail from the 3rd report still holds: This species shows preference for damp, decaying timber subterranean habitats up to 50cm underground, especially tree stumps, mainly but not exclusively of broadleaved timber. It will occasionally breed in decaying wood of artificial structures and even, very occasionally, other decaying plant matter such as compost heaps. The soil type is important with most populations breeding in timber on warm alluvial soils. Soils over chalk appear to be less favoured and stag beetles are absent from areas with extensive underlying chalk, with the exception of alluvial soils in river valleys cutting through chalk downs etc. The species also uses decaying man-made timber structures such as fence posts. In combination, though we understand the habitat, observe that decay processes are happening on an ad hoc basis, we have no systematic way of evaluating the resource over this area and is many locations that are not open for scrutiny, especially in urban London. Given that species has a reliance on subterranean timber rot as the larval substrate, it is extremely hard to even consider estimation the habitat extent. It is also clear that the species is able to use rotting fence posts and other man-introduced timber in the landscape in its core area, making the exercise even harder to undertake. Whilst skewed by recorder bias, the 2011 Greater London survey (London Wildlife Trust, 2011) showed the dominance of suburban housing garden records (160), followed by streets and pavements (76).

8.3 Additional information	The issues raised during the 3rd report remain. The strong concentration of this species in the heavily populated south-east of England brings a number of pressures and oppportunities. Re-development and the loss of old timber can result in localised losses, and a subtle fragmentation of the population within a borough. Harvey & Gange (2011) note the strong likelihood of this species existing within a meta-population structure, meaning that both changes in urban land use patterns could break links and result in more population isolation. This is especially true for this species, as radio-tracked males were reported in only achieving a maximum flight distance of 50m, and a total displacement maximum distance of 225m, whilst females were tracked no further than 30m from their intial tag site (Hawes, 2009). This urban-constrained population travelled considerably less (Rink and Sinsch, 2007) than similar animals in Germany, where typicaly countryside value were in the order of 1720m for the furthest flight. It is likely that the complex built geometry and lighting of urban London confined the movement of stag beetles, which are either ground moving or flying low. Fremlin (2013) notes the stag beetle-human relationship and explores our responses to encounters with this species.
9.5 List of main conservation measures	This is primarily the provision of information through a couple of well managed websites, in addition to the national surveys which maintain focus. As Fremlin (2013) notes, there does need to be more work on the impacts of larval translocation, as this is the commonest operation acting on the species if the garden survey results are extraploted more widely. The species is assessed as Least Concern in GB (Lane & Mann, 2016).
12.1 Population size inside the pSCIs, SCIs and SACs network	An ad hoc data gathering which was undirected, but which turned up 10 hecatads within the New Forest, demonstrating distributional stability there from the 3rd report (which returned 8 hectads). There are a scatter of hecatds on the SAC series north-east up from the new Forest, and a greater spread of records than reurned in the 3rd report. The effective doubling of the records is probably not from any expansion, but just attributable to ad hoc recording sending in more records on these sites; there are high degrees of habitat stability in these sites, so no substantive change between the 3rd and 4th periods.