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

Supporting documentation for the Third Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2007 to December 2012
Conservation status assessment for

Species:

S1083 - Stag beetle (*Lucanus cervus*)

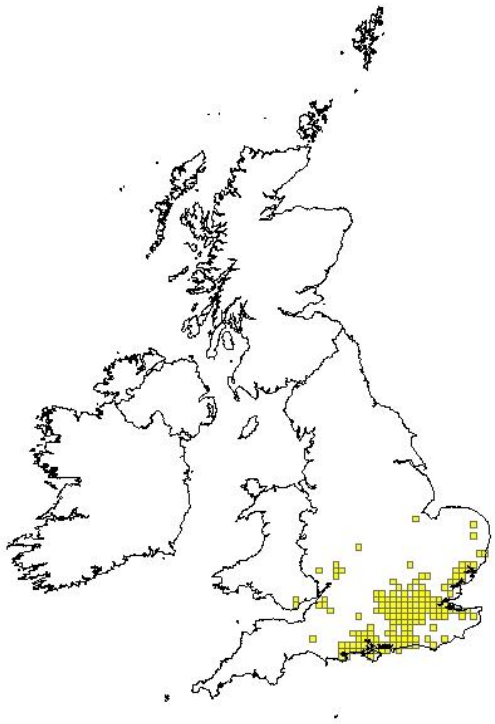
IMPORTANT NOTE – PLEASE READ

- The country-level reporting information contained in this document is a contribution to the Article 17 UK report for the habitat/species concerned.
- It has been provided by **Natural England** and refers only to the state of the habitat/species in **England** - it does not constitute an assessment for the whole of the UK.
- The Article 17 UK Approach document provides details on how this information has been used and, combined with information supplied by other Statutory Nature Conservation Bodies
- The format of the document is closely aligned to that set out by the European Commission for Member State reporting – as a result, some of the fields are not applicable at a country-level and have deliberately been left blank – in addition, the content of most fields is constrained by the EC reporting categories.

Reporting format on the 'main results of the surveillance under Article 11' for Annex II, IV & V species

Field name	*Brief explanations*	
0.2 Species	**0.2.1 Species code**	**S1083**
	0.2.2 Species scientific name	***Lucanus cervus***
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	**Stag beetle**

1.1 Maps			
1.1.1 Distribution map		**Sensitive**	**False**



1.1.2 Method used - map	**Complete survey/Complete survey or a statistically robust estimate**
1.1.3 Year or period	**2007-2012**
1.1.4 Additional distribution map	**False**
1.1.5 Range map	

2.1 Biogeographical region & marine regions	**ATL**
2.2 Published sources	**"http://www.rspb.org.uk/naturecount/results2011.aspx** **Smith, M.N. 2011. Great Stag Hunt III: National stag beetle survey 2006 – 2007, PTES. Http://www.ptes.org/?page=392** **Joint Nature Conservation Committee. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available from: www.jncc.gov.uk/article17** **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** **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."**

2.3 Range		
2.3.1 Surface area Range		
	A wide enough geographical distirbution in England for an alpha hull calculation to feel sensible and ecological justifiable.	
2.3.2 Method used Surface area of Range	**Complete survey/Complete survey or a statistically robust estimate**	
2.3.3 Short-term trend Period	**2001-2012**	
2.3.4 Short term trend Trend direction	**stable**	
2.3.5 Short-term trend Magnitude	**a) Minimum**	

	b) Maximum	
2.3.6 Long-term trend Period	**1991-2012**	
	Any apparent reduction of range could just as well be put down to the lack or recording in those northern and western areas after the push of the PTES Great Stag hunt had passed. The species remains reasonably common in England by any measures of other UK invertebrates.	
2.3.7 Long-term trend Trend direction	**stable**	
2.3.8 Long-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	
2.3.9 Favourable reference range	**a) Value in km²**	
	b) Operator for FRR	
	c) FRR is unknown (indicated by "true")	**False**
	d) Method used to set FRR	
2.3.10 Reason for change Is the difference between the reported value in 2.3.1 and the previous reporting round mainly due to…	**a) Genuine change?**	**False**
	b) Improved knowledge/more accurate data?	**False**

	c) Use of different method (e.g. "Range tool")?	**False**

2.4 Population		
2.4.1 Population size estimation (using individuals or agreed exceptions where possible)	**a) Unit**	
	b) Minimum	
	c) Maximum	
	This upper figure reflects the peak of the recording activity from the PTES work, and sourced records from areas not subsequently worked. It is likely that the "real" current population lies somewhere between these two, as there is little evidence of a massive decline in population or range. The very skewed nature of this dataset makes interpretation particularly hard.	
2.4.2 Population size estimation (using population unit other than individuals) Optional *(if 2.4.1 filled in)*	**a) Unit**	**number of map 10x10 km grid cells**
	b) Minimum	**157**
	This lower figure reflects the current square count largely gathered from "normal" levels of recording effort on this species, but with no special recording initiatives.	
	c) Maximum	**293**
2.4.3 Additional information on population estimates / conversion Optional	**a) Definition of "locality"**	
	b) Method to convert data	
	c) Problems encountered to provide population size estimation	**data generated from citizen science, so recording effort far from standardised.**
	With a larval life-cycle of 3 to 7 years any site loses will be hard to detect until all the larvae have bred through, and no adults does not necessarily equate with species loss. Smith (2011) notes that in 2007, the Great Stag hunt generated 3,058 Category 1 records (considered definte records), highlighting the strong positive recorder bias which such citizen science participation projects can generate. This particularly is so if one considers the 9,381 records sent into the scheme in 1998 which set a record-dense baseline against which false assumptions are easy to make. Smith goes onto note that between 1998 and 2007, the core population areas seemed stable, with little to no evidence of any	

	range contraction (p.13), and "and there is no evidence of any serious decline in stag beetle distribution".	
2.4.4 Year or period	**2006-2011**	
2.4.5 Method used Population size	**Estimate based on partial data with some extrapolation and/or modelling**	
2.4.6 Short-term trend Period	**2001-2012**	
2.4.7 Short-term trend Trend direction	**stable**	
2.4.8 Short-term trend Magnitude	**a) Minimum**	
	b) Maximum	
	229 ten km Squares, though the drop from the long term trend is almost certainly the result of recorder fatigue after the earlier recording enthusiasm; this seems especially true of the far northern and western record sets.	
	c) Confidence interval	
2.4.9 Short-term trend Method used	**Estimate based on partial data with some extrapolation and/or modelling**	
2.4.10 Long-term trend – Period	**1988-2012**	
	The apparent drop in the number of recorded squares between the historic survey and those founded in 2006-07 is almost certainly the result of a decline in public participation after the novelty of the 1st great Stag hunt took place. So, 1998 3,600 recorders took part, generating 9,381 records, whilst in 2007, only 1,471 recorders took part giving 3,058 records. Mapping the core distribution in the SE of England over the period shows a high degree of hectad stability which, at this scale, indicates some population stability though any losses at a local scale remain masked. A 2011 RSPB member survey of over 50,000 gardens reported that 1 in 50 had stag beetle, with up to 18% recording the species in the gardens of the London metropolis, again pointing to a core stability in that part of SE England. The London Wildlife Trust (2011) statred a two year stag beetle survey within Greater London, and had generated 307 records in the first year, with the strongest populations south of the Thames, with Hounslow Borough having the most records, followed by Wandsworth.	

2.4.11 Long-term trend Trend direction	**decrease**	
	It is notable that all the northern Midland and far south-western records are all derived from the PTES survey, and hence reflect strongly the recorder bias developed by those few years of sustained effort. The lack of subsequent records should not be taken as a range contraction but as a lack of recording effort after the inital momentum had passed. However, given the nature of the decline, it is likely that an under-lying trend of contraction has been experienced over the longer period, and this is reflected in the submission.	
2.4.12 Long-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
	293 ten km squares, a strong reflection of the strong recording bias of the early parts of the great Stag hunt.	
2.4.13 Long term trend Method used	**2**	
2.4.14 Favourable reference population	**a) Number of individuals/agreed exceptions/other units**	
	b) Operator	
	c) FRP is unknown indicated by "true"	**False**
	d) Method used to set FRP	
2.4.15 Reason for change Is the difference between the value reported at 2.4.1 or 2.4.2 and the previous reporting round mainly due to:	**a) Genuine change?**	**False**
	b) Improved knowledge/more accurate data?	**True**

	c) Use of different method (e.g. "Range tool")?	**True**

2.5 Habitat for the species		
2.5.1 Area estimation	**0**	
2.5.2 Year or period	**2007-2012**	
2.5.3 Method used Habitat for the species	**Absent data**	
2.5.4 Quality of the habitat	**a) Habitat quality**	**Moderate**
	b) Assessment method	**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.**
2.5.5 Short-term trend Period	**2001-2012**	
2.5.6 Short-term trend Trend direction	**unknown**	

2.5.7 Long-term trend Period		
2.5.8 Long-term trend Trend direction		
2.5.9 Area of suitable habitat for the species	**a) Value in km²**	**0**
	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).	
	b) Absence of data indicated as '0'	
2.5.10 Reason for change Is the difference between the value reported at 2.5.1 and the previous reporting round mainly due to	**a) Genuine change?**	**False**
	b) Improved knowledge/more accurate data?	**False**
	c) Use of different method (e.g. "Range tool")?	**False**

2.6 Main pressures		
a) Pressure	**b) Ranking**	**c) Pollution qualifier**
	H = high importance M = medium importance L = low importance	
E01: Urbanised areas, human habitation	H	
B02: Forest and Plantation management & use	M	

The strong concentration of this species in the heavily populated south-east of England brings a number of pressures and oppportunities. Tidniess 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 strucures embedded in the ground. Renewal of this resource is, in the absecne of guidance, a pressure of the localised population structure. Re-development and the loss of old timber can result in localised losses, and a subtle fragmentation of the population within a borough,

and 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.	
2.6.1 Method used – Pressures	**mainly based on expert judgement and other data**

2.7 Threats		
a) Threat	**b) Ranking**	**c) Pollution qualifier**
	H = high importance M = medium importance L = low importance	
B02: Forest and Plantation management & use	H	
E01: Urbanised areas, human habitation	M	

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. Tis 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.	
2.7.1 Method used – Threats	**expert opinion**

2.8 Complementary information	
2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant information	**Although PTES have continued to run the great stag hunt and are doing so again in 2012, the key thrust of the work remains close to the end of the last reporting period, with no 2007-2012 analysis yet performed. Main threats as judged by Natural England casework referrals are all from small scale development works, be that fence replacements or tree removals in urban areas in SE England; the fate in the wider countryside is unknown, but removal of dying trees would seem sensible albeit unknown area of focus. However, persistence of records within the core hectads suggest some stability: 107 hectads had stag beetles recorded in them over each of the 4 survey periods, with another 15 having records over 3 surveys. The 50,000 reporter strong RSPB nature count survey was not specifically targetted at stag beetle, but nevertheless re-inforced the view of good species representation in the SE of England and the gardens of Greater London. This is reflecdted,**

	although with a small number of respondents in the London Wildlife trust data for 2011 Greater London where they note "The records received confirm the existing distribution; they do not appear as a random spread **across London. A number of records appear outside the main clusters, but overall the pattern fits remarkably close to the distribution of records gathered from a number of specific surveys over the past 15 years." p13.** **There have been no targetted stag beetle surveys across the SAC series; however, all the top saproxylic sites continue to have large volumes of deadwood and resiliant and important saproxylic fauna, of which stag beetle is at the more catholic end in terms of habitat choice.**
2.8.3 Trans-boundary assessment	

2.9 Conclusions *(assessment of conservation status at end of reporting period)*
Please refer to the United Kingdom assessment for this species.

3 Natura 2000 coverage & conservation measures - Annex II species ***(only applies to species listed under Annex II of the Directive)***

3.1 Population		
3.1.1 Population size Estimation of population size included in the SAC network	**a) Unit**	**number of map 10x10 km grid cells**
	b) Minimum	**10**
	c) Maximum	**10**
	Stag beetle occurs in 10 ten kilometre squares within the SAC series, yet within this is more detail. The surroundings of Richmond Park and Epping Forest are record dense, and the sites probably act in part as a source of populating their surroundings. The 8 squares in The New Forest is probably a function of the large size of the site and the relatively poor recorder coverage over large parts of it (certain hot spots tend to be visited by entomologists on that site), and throughout, the intensity of recording effort has diminished from the previous high driven by the Great Stag Hunt. Epping forest SSSI is mostly favourable,	

	whilst Richmond, The New forest and Wimbledon SSSI are largely unfavourable recovering, with some units either as unfavourable or favourable. The saproxylic interest of all sites is well known and understood.
3.1.2 Method used	**Estimate based on partial data with some extrapolation and/or modelling**
3.1.3 Trend of population size within the network (short-term trend)	**stable**

3.2 Conservation measures

Conservation measures taken (i.e. already being implemented) within the reporting period and provided information about their importance, location and evaluation.

3.2.1 Measure	**3.2.2 Type**					**3.2.3 Ranking** H = high importance M = medium importance L = low importance	**3.2.4 Location** where the measure is PRIMARILY applied			**3.2.5 Broad evaluation of the measure**					
	a) Legal/statutory	**b) Administrative**	**c) Contractual**	**d) Recurrent**	**e) One-off**		**a) Inside**	**b) Outside**	**c) Both inside & outside**	**a) Maintain**	**b) Enhance**	**c) Long term**	**d) No effect**	**e) Unknown**	**f) Not evaluated**
3.1: Restoring/improving forest habitats				Y		M			Y		Y				
6.1: Establish protected areas/sites	Y	Y				M		Y			Y				
6.3: Legal protection of habitats and species	Y				Y	M			Y						Y

This is a reflection of the move inunderstanding of the value of deadwood in parkalnds and woods by bodies such as the Forestry Commission and The royal Parks, and the application of that advice to wider countryside as well as protected sites. There has been some limited site protection additions (Bushy Park near richmond is ongoing in 2012). The protection afforded to stag beetle has resulted in case referrals and appropriate advice being given to secure the species on sites where it might

previoulsy not have happened, resulting in better local outcomes.