

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

**Second Report by the United Kingdom under  
Article 17**

**on the implementation of the Directive  
from January 2001 to December 2006**

**Conservation status assessment for :**

**S1902: *Cypripedium calceolus* - Lady's-slipper  
orchid**

Please note that this is a section of the report. For the complete report visit <http://www.jncc.gov.uk/article17>

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## **S1902 *Cypripedium calceolus* Lady's-slipper orchid**

*Audit trail compiled and edited by JNCC and the Plant Conservation Working Group*

This document is an audit of the data and judgements on conservation status in the UK's report on the implementation of the Habitats Directive (January 2001 to December 2006) for this species. Superscript numbers accompanying the headings below, cross-reference to headings in the corresponding Annex B reporting form. This supporting information should be read in conjunction with the UK approach for species (see 'Assessing Conservation Status: UK Approach').

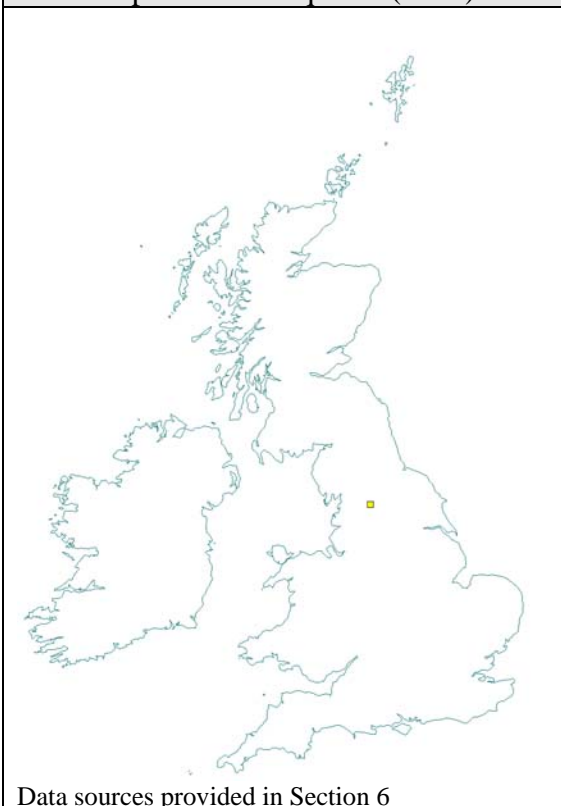
### **1. Range Information<sup>2,3</sup>**

This is currently found as a wild plant in only one location in the UK. Although work is ongoing to re-introduce it into 12 additional locations, only once plants are fully established will they be included in range and population calculations. Establishment requires that they are successfully reproducing.

#### **1.1 Surface area of range<sup>2,3,1</sup> 100km<sup>2</sup>**

The above estimate was calculated using a 10-km square resolution, such that each completely terrestrial square contributes an area of 100 km<sup>2</sup>.

**Map 1.1.** Current extent of occurrence and occupied 10-km squares (2006)



#### **1.2 Date of range determination<sup>2,3,2</sup> 2006**

This species has been closely monitored. Hence it is possible to make a judgement on surface area with high confidence for 2006.

### **1.3 Quality of range data<sup>2.3.3</sup>**

#### **Good**

This species has received close monitoring due to its rare status. Quality of data is therefore good.

### **1.4 Range trend<sup>2.3.4</sup> & Range trend magnitude<sup>2.3.5</sup>**

#### **Stable**

Since the Directive came into force the range has remained stable. There is an ongoing re-introduction programme, but the trend is not given as increasing since the populations are not yet established.

### **1.5 Range trend period<sup>2.3.6</sup>**

#### **1994 – 2006**

The trend has in fact remained stable for a longer period than this. The range has been as current since the 1930s.

### **1.6 Reasons for reported trend in range<sup>2.3.7</sup>**

#### **3. Direct human influence (restoration, deterioration, destruction)**

The stable trend has only been possible due to very intensive conservation management and wardening. Without this direct human influence the plant is very likely to have become extinct.

### **1.7 Favourable reference range<sup>2.7.1</sup>**

#### **3,500km<sup>2</sup>**

The decision tree in Note 1 has been used as a guide in determining the favourable reference range estimate (see 'Assessing Conservation Status: UK Approach').

The current trend is stable. However, this is due to very intensive conservation care, without which it would almost certainly be extinct. This in itself suggests that the current range is more than 10% below the favourable reference range value. Additionally, the current range is extremely restricted, and it is at very high risk from both stochastic events and other threats such as theft. This also suggests that the current range is more than 10% below the favourable reference range value.

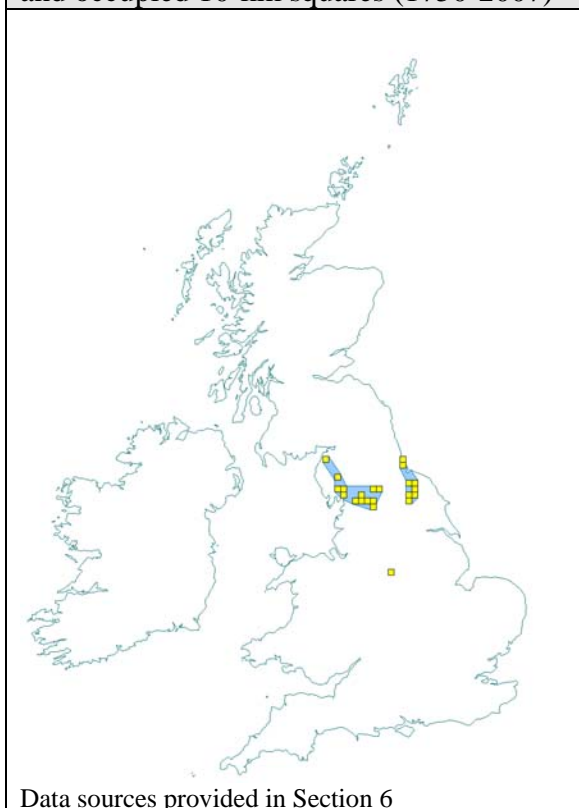
Although *Cypripedium calceolus* has persisted naturally since the 1930s in just 100 km<sup>2</sup>, this has only been made possible through intensive conservation effort and management. Furthermore, it is a single individual that has persisted since the 1930s, since this is an extremely long-lived perennial plant. However, natural pollination is not occurring and there has been no reproduction. This is not considered 'viable'.

The favourable reference range must be set so as to allow natural pollination to occur, which requires a sufficiently large area for pollinator foraging, and movement between populations. It is believed that the UK population has not been viable for a very long period, a fact that has been masked by the long lifespan of the remaining plants. Professional judgement is that the historic range (Map 1.2), with the exception of the most northerly Cumbrian outliers, is more representative of a 'favourable reference range'; that is, a range large enough to support

viable populations. When the historic range is re-calculated using the alpha software with the northern most 10-km square in Cumbria excluded, the extent of occurrence is 3,926 km<sup>2</sup>. The favourable reference range has been set a little below this at 3,500 km<sup>2</sup>. This would place the plant in the Endangered IUCN category unless there were also improvements in population structure.

Map 1.2 shows the historic extent of occurrence (1750-2007), calculated at 4,426 km<sup>2</sup> (using Alpha Hull software and an alpha value of 20 km). A comparison of this, and the current extent of occurrence (100 km<sup>2</sup>), suggests a decline of 98% between the mid 18<sup>th</sup> Century and the 1930s. Since then, the range has remained stable (due to the persistence of a single individual), and this recent trend is what is reported.

**Map 1.2.** Historic extent of occurrence and occupied 10-km squares (1750-2007)



## 1.8 Range conclusion<sup>2.8</sup>

### Unfavourable – Bad but improving

Although range has been stable since the 1930s, the current range is more than 10% below the favourable reference value. Hence, in accordance with Annex C, range is assessed as Unfavourable – Bad. However, the current re-introduction programme means that the range is also improving.

## 2. Population of the species<sup>2.4</sup>

### 2.1 Population estimate<sup>2.4.1</sup>

1 individual

There is only one individual naturally occurring (not as a part of the re-introduction programme, or planted) in the UK.

## **2.2 Date of population estimate<sup>2.4.2</sup>**

**2006**

## **2.3 Method of population estimate<sup>2.4.3</sup>**

**3 = from comprehensive inventory**

## **2.4 Quality of population data<sup>2.4.4</sup>**

**Good**

This species has received close monitoring due to its rare status.

## **2.5 Population trend<sup>2.4.5</sup> & Population trend magnitude<sup>2.4.6</sup>**

**Stable**

Since the Directive came into force the population has remained stable at one individual. There is an ongoing re-introduction programme, but the trend is not given as increasing since the populations are not yet established.

## **2.6 Population trend period<sup>2.4.7</sup>**

**1994 – 2006**

The trend has in fact remained stable for a longer period than this. The population has been as current since the 1930s.

## **2.7 Reasons for reported trend in population<sup>2.4.8</sup>**

**3. Direct human influence (restoration, deterioration, destruction)**

The stable trend has only been possible due to very intensive conservation management and wardening. Without this direct human influence the plant is very likely to have become extinct.

## **2.8 Justification of % thresholds for trends<sup>2.4.9</sup>**

**Not applicable**

## **2.9 Main pressures<sup>2.4.10</sup>**

**250 Taking / Removal of flora, general**

**251 pillaging of floristic stations**

Historic declines in population have been almost entirely due to digging up and collection by unscrupulous gardeners and plant collectors. It has also suffered from trampling by visitors, and lack of natural pollinators. Over-grazing in limestone pastures and on pavement areas has also been a negative factor. However, the maintenance of one individual since the 1930s has been largely due to careful management and close surveillance.

## **2.10 Threats<sup>2.4.11</sup>**

**250 Taking / Removal of flora, general**

**251 pillaging of floristic stations**

## **2.11 Favourable reference population<sup>2.7.2</sup>**

**2000 individuals**

The decision tree in Note 1 has been used as a guide in determining the favourable reference population estimate (see ‘Assessing Conservation Status: UK Approach’).

The current trend is stable. However, this is due to intensive conservation care, without which the plant would almost certainly have become extinct. The single remaining individual is not capable of natural reproduction, and will eventually die, thus leading to extinction, unless a larger population is achieved. If all proposed reintroductions were successful, there would be 13 sites with a minimum of 100 plants at each. However, this only just takes the species out of IUCN Vulnerable category. This could be viewed as the minimum ‘target’ population, but to be stated as ‘favourable’, based on expert opinion, a buffer of ~50 additional plants per site would give ~2000 plants scattered throughout the favourable reference range and the outlier sites. This is a realistic value and is biologically meaningful, as there would be sufficient plants to ensure the main pollinator bee genus *Andrena* can image *Cypripedium* as a pollen source.

## **2.12 Population conclusion<sup>2.8</sup>**

### **Unfavourable – Bad but improving**

While the population may stable, it is not viable in the long term, as constant wardening is needed to ensure the survival of the species in the UK. The current population is more than 25% below the favourable reference population, and hence the assessment is Unfavourable – Bad, but improving due to the re-introduction programme.

## **3. Habitat for the species in the Biogeographic region or sea<sup>2.5</sup>**

This species requires very lightly grazed wood-pasture or woodland which has edaphically or topographically maintained clearings (I. Taylor, Cypripedium Committee).

Micro-habitat conditions, principally soil structure and fungal associations may be limiting current establishment of re-introduced plants (Preston et al. 2002).

### **3.1 Surface area of habitat<sup>2.5.2</sup>**

#### **Unknown**

There is insufficient information to map and calculate this area.

### **3.2 Date of estimation<sup>2.5.3</sup>**

#### **Not applicable**

### **3.3 Quality of data on habitat area<sup>2.5.4</sup>**

#### **Poor**

Although habitat requirements are understood at a coarse scale, the fungal associations or how fungal distribution might impact the species are not fully understood.

### **3.4 Habitat trend<sup>2.5.5</sup>**

#### **Unknown**

Given that specialists have a relatively limited understanding of this species’ habitat, it is not appropriate to comment on trends at this time.

### **3.5 Habitat trend period<sup>2.5.6</sup>**

#### **1994 – 2006**

### **3.6 Reasons for reported trend in habitat<sup>2.5.7</sup>**

**Not applicable**

### **3.7 Suitable habitat for the species (in km<sup>2</sup>)<sup>2.7.3</sup>**

**Unknown**

### **3.8 Habitat conclusion<sup>2.8</sup>**

**Unknown**

The data available is too limited to make a viable assessment.

## **4. Future Prospects<sup>2.6</sup>**

**Poor prospects**

“Species is likely to struggle unless conditions change.”

In the UK, *C. calceolus* is protected under Schedule 4 of the Conservation (Natural Habitats, etc.) Regulations 1994 and Schedule 8 of the Wildlife and Countryside Act 1981, as amended. It is also the subject of a Species Action Plan under the UK Biodiversity Action Plan.

Work is ongoing to re-introduce this species into 12 additional locations. However, it will take many years/decades (and is therefore beyond the timeframe for assessing future prospects) and other resources to establish a viable population in the UK because there is such a small current resource. Genetic stock is also an issue. Work has been done on producing plants both from self-plants (using the pollen from plants in the wild) and also using pollen from other plants that are known to be of native origin; the more distantly related plants are, the stronger the offspring have been found to be (I Taylor, *pers. comm.*).

For these reasons, expert opinion is that future prospects cannot confidently be reported as ‘good’ (defined by the Commission as “species is expected to survive and prosper”), at least within the next 12 years. However, once re-introduced plants have become established, prospects are expected to improve.

### **4.1 Future prospects conclusion<sup>2.8</sup>**

**Unfavourable – Inadequate but improving**

## **5. Overall Conclusion<sup>2.8</sup>**

**Unfavourable – Bad but improving**

Range and population have both been identified as Unfavourable – Bad but improving; Future Prospects are Unfavourable – Inadequate but improving; habitat was Unknown. Hence, because at least one parameter was reported as bad, (in line with Annex C) the overall assessment is Unfavourable – Bad. It is also reported as improving to reflect the positive management programme that has been, and continues to be, undertaken.

**Table 5.1.** Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
Range	Unfavourable – Bad but improving	Current range is more than 10% below the favourable reference range	1
Population	Unfavourable – Bad but improving	Current population estimate is more than 25% below favourable reference population	1
Habitat	Unknown	No or insufficient reliable information available	N/A
Future Prospects	Unfavourable – Inadequate but improving	Any other combination  Many positive management and protective measures have been put in place to protect this species. However, experts cannot confidently report that the species will remain viable in the long-term until re-introduction sites have become established. This is beyond the time frame for assessment.	2
Overall Assessment	Unfavourable – Bad but improving	One or more Unfavourable – Bad	1

\*1=High, 2=Moderate, 3=Low

High – Expert opinion is that the concluding judgement accurately reflects the current situation based on a professional understanding of the species. For range, population, and habitat, quality of data used to establish the current estimate has been identified as “good”; data used to inform trends is comprehensive and up to date.

Moderate – A greater understanding of the feature, or the factors affecting it, is required before a confident concluding judgement can be made by experts. For range, population, and habitat, the current estimate and/or trend are based on recent, but incomplete or limited survey data; or alternately, a comprehensive, but outdated (pre-1994) review.

Low – Judgements, and comprising estimates, are based predominately on expert opinion.

N/A – Assessment conclusion is “unknown”, on the basis of insufficient reliable information

## 6. References

KULL, T. 1999. *Cypripedium calceolus* L.: Biological Flora of the British Isles no. 208. *Journal of Ecology* **875**, 913-924

RAMSEY, M. M. & STEWART, J. 1998. Re-establishment of the lady’s slipper orchid *Cypripedium calceolus* L. in Britain. *Botanical Journal of Linnean Society*, **126**, 173-181

PRESTON, C. D., PEARMAN, D. A. & DINES, T. D. 2002. *New Atlas of the British & Irish Flora*. Oxford University Press

WIGGINGTON, M. J. 1999. *British Red Data Books: 1 Vascular Plants* (3rd ed.) Joint Nature Conservation Committee



## **Map Data Sources**

Vascular Plants Database, Botanical Society of the British Isles, via the National Biodiversity Network (NBN) Gateway;  
Ian Taylor, Natural England, *pers. comm.*