

The status and distribution of the leaf beetle *Bromius obscurus* (Linnaeus, 1758) in Cheshire in 2019 and 2020

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Summary

In 2019 and 2020 fieldwork was carried out to assess whether *Bromius obscurus* was still present at sites where it had previously been recorded on the Cheshire and Staffordshire border and to find new sites. The fieldwork in 2019 was partly successful as the beetle was found to be extant at one site in Staffordshire, but no new sites in Cheshire were discovered. It was intended to carry out more extensive fieldwork in 2020, but restrictions on travel due to the Covid-19 pandemic initially hampered research. Site visits were carried out later in the year and confirmed presence at a new Cheshire locality that had been reported by another invertebrate ecologist, followed by a new record from another nearby site. This account summarises all historical and recent records of the species known to the author prior to the work in 2019 and 2020 and new records and is partly taken from Stenhouse (2020).

Introduction

A summary of British *Bromius obscurus* records

The leaf beetle *Bromius obscurus* (Linnaeus, 1758) is a somewhat enigmatic species in Britain, being recorded from only a few locations over the past two hundred years (Table 1), and apparently much scarcer than the distribution of the known food plants would suggest it should be.

The Chrysomelidae review by Hubble (2014) accords the beetle IUCN Critically Endangered status based on the number of locations or subpopulations, area of occupancy and continuous decline. The species account says that it is currently only recorded from one site in Scotland after ‘a marked historic decline’. However, prior to 1981 there were no definite records, and in recent years there had not been any searches carried out for the beetle other than at Rushton Spencer. No contact was made with local recorders, so a decline had not been verified and a Scottish record adds a site. However, based on the number of 10km squares recorded for the species it *appears* to be rare.

Why is *B. obscurus* *apparently* so rare despite feeding on widely distributed, common plants and is it a native species? It could be expected that the beetle would be widespread and common, reflecting the distribution of its known foodplants, unless recently introduced. According to the excellent BUGSCEP program (Buckland & Buckland, 2006), *B. obscurus* has been recorded as sub-fossil remains from many locations in Britain during archaeological digs. In the late glacial period, approx. 13,500 to 10,000 BP, the beetle was present in modern Cheshire, Shropshire, East and North Yorkshire, Norfolk, Gwynedd, Powys, West Midlands, Dumfriesshire, Cumbria and Wexford in Ireland. However, there are no recent sub-fossil records, suggesting extirpation of the species in Britain and subsequent introduction, reminiscent of the history of the leaf beetle *Agelastica alni* (Linnaeus, 1758) reported in Stenhouse (2012). Of course, a fairly mundane reason why the beetle seems to be so rare could be that it has been passed over. The foodplants are not a target for coleopterists generally, being host to very few species.

The species was first mentioned by Stephens (1831) as ‘In the British Museum there is a specimen of this insect, said to have been captured in Lincolnshire’ and this was basically repeated in Stephens (1839). Unfortunately, no detail was given on a location or collector, nor is there a specimen in the Natural History Museum, London and generally the record has been discounted and forgotten about.

About 120 years later there was a suggestion that *B. obscurus* had been found and 'lost' by the Finnish born Baron Alexis de Porochin. He had seen *B. obscurus* on many occasions in Finland and during a trip to Mouldsworth Pond near Delamere, Cheshire (grid ref unknown) in June 1955 with Peter Skidmore, he was adamant that he had seen, but not captured a singleton of *B. obscurus* (Skidmore, 2003). About 25 years later the beetle was reliably recorded by Peter Kendall (1982) who found several specimens at Hugbridge Farm near Bosley, Cheshire (SJ930637) on 29 August 1979 and subsequently identified by Peter Skidmore (Kendall, 1982) and David Nash also collected *B. obscurus* in the same year (D. Mann, pers comm). Ian Menzies recorded the beetle from Rushton Spencer in 1992 (Cox, 2007). Colin Johnson, the entomology curator at Manchester Museum, visited the Bosley site in 1992 and obviously found the beetle in numbers, as there were twenty-one specimens from that locality and date in the Manchester Museum collection as of 20th March 2014.

On 15 June 2009, an attempt was made to find out if the beetle was still extant in Cheshire by Don Stenhouse and Paul Cousins, who made a visit close to the Hugbridge site on the River Dane (SJ930635) without success. Clive Washington subsequently searched for the beetle, also without result. On the 30th June 2013 a visit was made to Rushton Spencer area (Figure 1) just a few hundred metres over the Cheshire (VC58) boundary in Staffordshire. In total we counted 17 specimens from rosebay willowherb *Chamerion angustifolium* then swept and searched along to the bridge at Beat Lane (SJ937616) where we examined both rosebay and great willowherb *Epilobium hirsutum* which was unproductive. We crossed Station Lane and walked up to Dye House Lane SJ931629. Despite finding two likely stands of *C. angustifolium*, no further specimens resulted. On the 11th July 2013 Clive Washington visited the same area and found eight specimens after an hour searching in hot sunshine and noted numerous feeding signs suggestive of a large population.



Figure 1. The Rushton Spencer site

Despite the mention of possible Lincolnshire records of *B. obscurus* by Stephens (1831 & 1839), until 2013 the records from either side of the Cheshire (VC58) and Staffordshire (VC39) vice-counties border at Bosley and Rushton Spencer were the only definite ones. However, in June 2013 Charles Barnes recorded it from Crosby Grange in the Scunthorpe area in Lincolnshire and it has since been recorded in the area many times (Barnes, 2021). In 2018 there was a surprising record from the Jupiter Reserve in Stirlingshire, Scotland approximately 200 miles (320 km) from the Cheshire sites. The following year there was a serendipitous find of the beetle by David Bentley at Brereton Heath, which added a site to the known Cheshire distribution.

Table 1. Summary of known *B. obscurus* records prior to 2019.

Location	Location description	Grid ref	VC	Date	Recorder
Hugbridge Farm	River Dane	SJ930637	58	29/08/1979	P. Kendall
Bosley	River Dane	SJ9263	39/58	23/08/1981	D. Nash
Hugbridge Farm	River Dane	SJ930637	58	1992	C. Johnson
Crosby Grange		SE870123	54	14/06/2013	E. Gaunt, J. Davison
Crosby Grange		SE81	54	15/06/2013	C. Barnes
Atkinson's Warren		SE8712	54	29/06/2013	C. Barnes
Scunthorpe	dismantled railway	SE8610	54	29/06/2013	C. Barnes
Crosby Grange		SE81R	54	09/08/2013	E. Gaunt
Atkinson's Warren		SE8712	54	27/04/2014	C. Barnes
Crosby Grange		SE86911233	54	19/05/2014	W. Gaunt
Crosby Grange		SE81R	54	25/05/2015	J. Davison, P. Lee, M. Blissett
Scunthorpe		SE870122	54	07/06/2015	S.A. Lane
Crosby Grange		SE8712	54	15/05/2018	E. Gaunt
Crosby Grange		SE81	54	12/05/2019	C. Barnes
Jupiter Reserve	next to railway and saw mills	NS9193581127	86	14/07/2018	S. Burgess
The Magical Meadows		NS91938112	86	14/07/2018	Suzanne Burgess
Rushton Spencer	dismantled railway	SJ937621	39	30/06/2013	D.A. Stenhouse, R. Lawton
Rushton Spencer	dismantled railway	SJ937621	39	11/07/2013	C. Washington

Life cycle and description of the beetle

In the summer, eggs are laid near or at the base of the stems of the host plants, in batches. The larvae are subterranean and feed on the roots of the host removing the outer layers. They develop over the summer and early autumn then move more deeply into the ground to overwinter. In the spring they pupate and the adults emerge 20 -30 days later, living for several months (Duff, 2016).

The main foodplants are *C. angustifolium* and *Epilobium* willowherb species. There is a suggestion that *Petasites japonicus* butterbur is a food plant (Cox, 2007) but there are no modern records from the species. On mainland Europe it has been recorded from *Rubus* blackberry and *Vitis* grapevine and often regarded as a [pest species](#) and in parts of Canada is a [notifiable pest](#) of *Rubus* roses and grapes. The adult is quite a squat insect, covered in a sparse greyish pubescence and completely black or dark brown, except for segments 2-4 of the antennae which are mainly orange (Figure 2), the first segment being orange ventrally and black dorsally, the 2nd and 3rd completely orange, and the fourth orange at the base and black in the second half. There are no similar species. It is parthenogenetic, at least in the UK and mainland Europe, males being unknown (Duff, 2016). It is likely that the beetle can fly as it has very prominent elytral humeri, suggesting well developed flight muscles, and a specimen from Rushton Spencer that Don Stenhouse examined had large wings.



Figure 2. Captive *B. obscurus* © Bill Urwin

Aim and Objectives

Aim

Determine the distribution and status of the leaf beetle *Bromius obscurus* in suitable habitat in Cheshire.

Objectives

1. Survey all known sites with recent records of the species between April and September 2019 and 2020 to determine the current status.
2. Survey sites thought likely to contain the species.
3. Provide evidence to inform the current status of the beetle which is based on estimates of population size and area of occupancy from limited data.

Methods

Prior to survey work, a desk-based study was carried out using published records and NBN atlas records.

Fieldwork began with searching for stands of the main known foodplant, *C. angustifolium*. Besides the presence of beetles, the plants were examined for feeding signs (Figure 3). These are typically linear, being much longer than wide, but may be irregular in shape. They are often low down on the plant.

The beetle is not difficult to spot being quite prominent on the upper surface of leaves, although having a tendency to drop off the leaf if it detects a shadow. This means a stealthy approach is best.



Figure 3. *B. obscurus* linear feeding signs on *C. angustifolium*.

Sweeping was also carried out, and sometimes produced specimens when none were visible. Care was taken not to damage the willowherb by sweeping too vigorously.

It is not possible to gauge presence of the species from larvae as they are subterranean, feeding on the roots of the host.

Survey Sites

Wirral Way, Hooton

On the 16th June 2019 Don and Ruth Stenhouse surveyed the dismantled railway now known as the Wirral Way (Figure 4), at the Hooton station end and walked approximately 2km between SJ349782 [green] and SJ340773 [red]. *C. angustifolium* was prevalent on both sides of the path but not consistently so, with gaps between dense stands. Despite careful examination of the plants and extensive sweeping, no feeding signs or beetles were found.

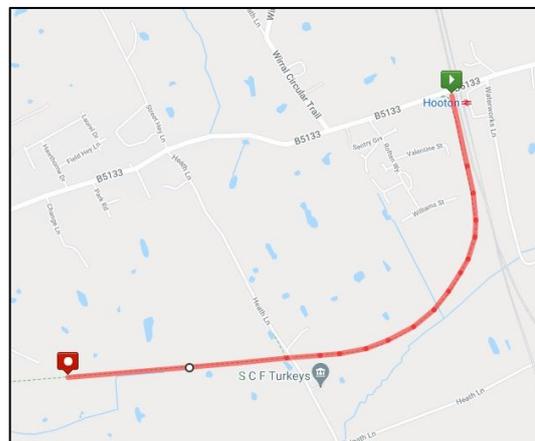


Figure 4. Hooton end of the Wirral

Bosley area and Rushton Spencer

On the 5th Aug 2019, D.A. Stenhouse and Paul Cousins surveyed the Bosley area in an attempt to visit historical locations between Bosley and Hugbridge farm, all off the A523. However, the volume of traffic and restricted parking made this difficult and one site could not be found. At Hugbridge (SJ930637) the bank of the River Dane, from where the beetle has been recorded, was inaccessible due to a fence. That may not have been there when P. Kendal and C. Johnson recorded the beetle in 1979 and 1992. It was possible to see a dense stand of *C. angustifolium* on the bank.

To retrieve some value from the day it was decided to search along the Staffordshire Way in Rushton Spencer (Figure 5) from the Rudyard Reservoir (SJ943603) [green] to the end of the path near the River Dane [red]. Unfortunately, it was not possible to access the riverbank due to a fence across the path. We recorded five beetles from the same area as on previous visits (SJ937621) and nowhere else.

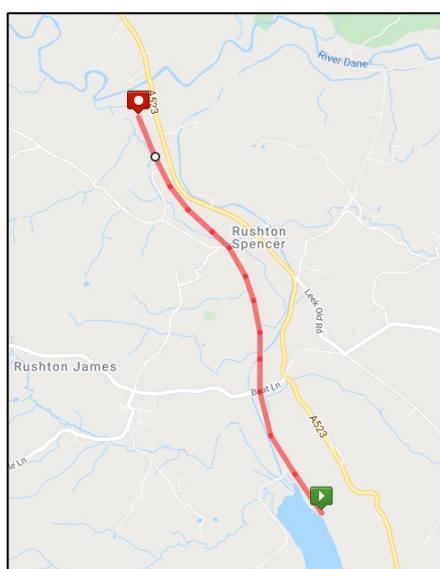


Figure 5. Rushton Spencer survey

Brereton Heath, Radnor Bridge and Swettenham

In 2019, *B. obscurus* was recorded from Brereton Heath by D. Bentley. To verify continued presence of the beetle, a visit was made to Brereton Heath LNR (SJ799653) by D.A. Stenhouse and C. Washington on 27th May 2020 (Figure 6). Three beetles were taken from the fairly sparse stands of *C. angustifolium*.

Following a search for another suitable site a brief visit was made to Radnor Bridge on the banks of the River Dane (SJ831652). There was very little *C. angustifolium* on the site, although there was a large patch of *P. japonicus*, which was examined without success.

Several days later on 31st May C. Washington visited the Swettenham Meadows nature Reserve (SJ795673) [in green] near the River Dane and recorded three specimens of *B. obscurus*.

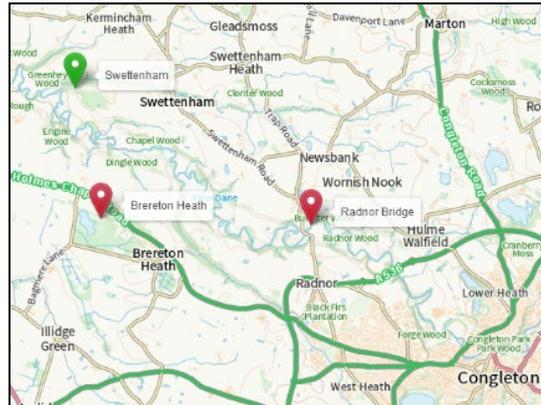


Figure 6. Brereton Heath visit

Micro-sites and Danebridge

On 20th July 2020 D.A. Stenhouse and C. Washington met up with the intention of looking for suitable sites with stands of *C. angustifolium* in the Bosley area. On driving along the A54 it became apparent that the plant was prolific on the roadside verges or adjacent fields (Figure 7). To make the most of the opportunity, five such micro-sites were swept and examined for feeding signs, without result. The farthest of the sites at Wincle is near to the large valley woodland at Danebridge, which follows the R. Dane. This was surveyed, although it soon became apparent that there was little *C. angustifolium* and the visit became an opportunity to collect any Coleoptera of interest. These included two species of Staphylinidae taken from shingle on the riverbank, *Thinonoma atra* (Gravenhorst, 1806), which may be a new VC39 record and *Thinodromus arcuatus* (Stephens, 1834) of which there are few VC39 or 58 records at all from the R. Dane. It was not apparent when moving around from one site to another where the Cheshire VC58 and Staffordshire VC39 boundaries lay. Some sites are literally on the boundary, others just inside Cheshire by a few hundreds of metres. Tunstall Road is in Cheshire, then the VC boundary, then Staffordshire (Figure 8).

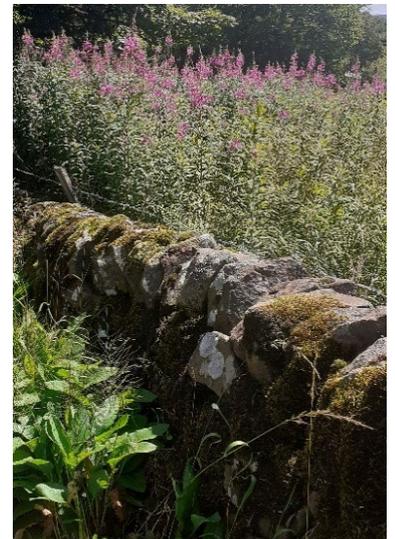


Figure 7. Willowherb in field on A54

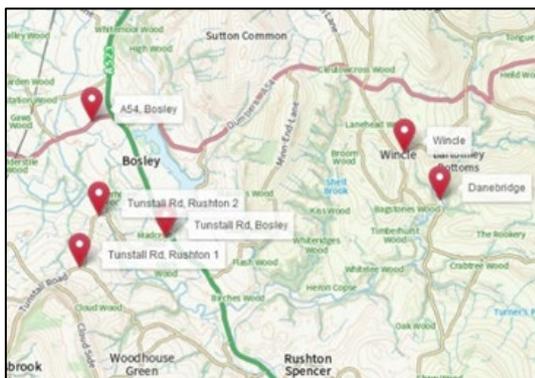


Figure 8. Micro-sites visited

- A54 near Bosley (SJ9097466562) - VC58
- Tunstall Road, Bosley (SJ921464700) - VC58
- Tunstall Road, Rushton 1 (SJ9107465054) - VC58/VC39
- Tunstall Road, Rushton 2 (SJ9077564226) - VC39
- Wincle (SJ9594166059) - VC58
- Danebridge (SJ965653) - VC58/VC39

Mouldsworth

Following discussion with D.A. Stenhouse regarding the sighting of *B. obscurus* in Mouldsworth by A. Porochin (see introduction), C. Washington visited the area on 24th July 2020 (Figure 9). Although there were stands of willowherb that looked promising, no *B. obscurus* or feeding signs were seen. A disused railway track that was the target of the visit was not accessible from the village as it would have meant walking along the track for several hundred metres and a satellite image suggested that it was heavily wooded. Exploring along the road towards Delamere forest was also unproductive.

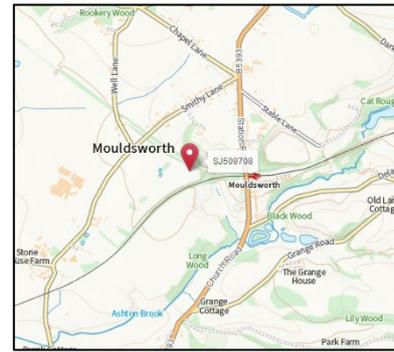


Figure 9. Mouldsworth

Findings

The distributional data gleaned from this survey is rather disappointing as the number of sites visited was lower than originally planned. This is largely because D.A. Stenhouse was constrained by transport issues during the Covid-19 pandemic as travel on public transport was discouraged and he was greatly assisted in this respect by C. Washington.

However, the work has produced some positive results. It is already obvious that the *B. obscurus* is more widespread and frequent than previously reported. Although D.A. Stenhouse did not add any new stie records, the discovery at Swettenham by C. Washington and a record outside the scope of this survey by D. Bentley (Table 2) showed that the beetle is present approximately 13km (8 miles) from the well-known Hugbridge and Rushton Spencer sites. The River Dane is a conduit between these areas.

The work makes it clear that *B. obscurus* is not a Critically Endangered species in the UK. Nor does it appear from the IUCN Threat Categories to be Endangered. It may have a population of less than 1,000 individuals as described in criterion D to meet the Vulnerable threshold (Appendix 2) or may be less than 10,000 individuals with a declining population. However, it is not possible to say with any certainty, and on the available evidence the beetle is probably best regarded as Data Deficient.

Table 2. Summary of recent records

Location	Location description	Grid ref	VC	Date	Recorder
Rushton Spencer	dismantled railway	SJ937621	39	05/08/2019	D.A. Stenhouse, P. Cousins
Brereton Heath LNR	heath & tall herb	SJ799651	58	15/07/2019	D. Bentley
Brereton Heath LNR	heathland marsh, tall herb	SJ798651	58	15/07/2019	D. Bentley
Swettenham	grassland	SJ795673	58	31/05/2020.	C. Washington

It is worth noting that since this work was carried out, Simon Cowley reported a find of *B. obscurus* from Mow Cop in Staffordshire in 13th Aug 2021. This currently unpublished record is the most southerly in the UK to date.

Recommendations for further survey

The Rushton Spencer site, just outside the Cheshire VC58 boundary, has been well visited in the last few years and obviously has a stable population. However, there are other recorded sites nearby and just inside the boundary, which still need to be revisited.

The Hugbridge site on the River Dane (Figure. 8) has abundant *C. angustifolium* and *B. obscurus* is possibly still present there. As the willowherb is inaccessible from the road due to a stout metal fence, the opposite bank needs to be accessed from the direction of the farm at Walhill. It may also be possible to ascertain presence from the road using a pair of binoculars capable of focusing down to a metre or so.



Figure 8. Hugbridge and Mill

Across the A523 and still on the Dane bank is the area surveyed by David Nash in 1981. He stated in record card notes that he looked on the Dane bank near the bridge, probably accessing it from the disused railway line. However, that area is difficult to access and probably unnecessary. On Mill Lane, near Pecks House Farm there is a track that leads to the Dane. Accessing that area and following the Dane could be productive as the site has altered little in the intervening 40 years and there is no reason to think the beetle is not still present.

The area around Brereton Heath should be thoroughly surveyed, with a particular focus on sites either side of the Dane.

A return visit should be made to the Mouldsworth area with a view to homing in on the Mouldsworth pond location mentioned by A. Porochin. Confirmation of presence in the area would vindicate his record and greatly extend the known distribution of the beetle, being approximately 30km to the West from the nearest site at Brereton Heath.

Any stands of *C. angustifolium* or *Epilobium* species, should be examined for the presence of *B. obscurus* or feeding signs. As the beetle is undoubtedly capable of flight, it should be assumed that it can move considerable distances.

The European reports of *B. obscurus* on *Rubus* species should be borne in mind when surveying for the beetle as it may be found on *Rubus sp.*, which is an extremely common and widespread plant but the foliage is possibly not generally examined by coleopterists.

Acknowledgements

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- Maps produced using Grid Reference Finder <https://gridreferencefinder.com> [accessed 15/01/2022]

Appendices

Appendix 1

The IUCN threat categories and selection criteria (adapted from Hubble (2014))

Summary of the 2001 Threat Categories

A brief outline of the revised IUCN criteria and their application is given below, a full explanation being available (IUCN, 2013) and on the IUCN web site (<http://www.iucnredlist.org/>; www.iucn.org/). The definitions of the categories are given in Figure 1 and the hierarchical relationship of the categories in Figure 2 (see Appendix 2). The category *Extinct in the wild* has not been applied in this review. All categories refer to the status in the GB (not globally).

CRITICALLY ENDANGERED (CR) A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Appendix 2).

ENDANGERED (EN) A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Appendix 2).

VULNERABLE (VU) A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Appendix 2).

NEAR THREATENED (NT) A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC) A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD) A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

NOT EVALUATED (NE) A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

Taxa listed as *Critically Endangered*, *Endangered* or *Vulnerable* are defined as Threatened (Red List) species. For each of these threat categories there is a set of five main criteria A-E, with a number of sub-criteria within A, B and C (and an additional sub-criterion in D for the *Vulnerable* category), and one of which qualifies a taxon for listing at that level of threat. The qualifying thresholds within the criteria A-E differ between threat categories and are summarised in Appendix 2.

Appendix 2

Summary of the thresholds for the IUCN Criteria

Criterion	Main thresholds		
	<i>Critically Endangered</i>	<i>Endangered</i>	<i>Vulnerable</i>
A. Rapid decline	>80% over 10 years or 3 generations in past or future	>50% over 10 years or 3 generations in past or future	>30% over 10 years or 3 generations in past or future
B. Small range + fragmented, declining or fluctuating	Extent of occurrence <100km ² or area of occupancy <10km ² + two of the following: - severely fragmented or only a single location - continuing decline - extreme fluctuations	Extent of occurrence <5,000km ² or area of occupancy <500km ² + two of the following: - severely fragmented or no more than 5 locations - continuing decline - extreme fluctuations	Extent of occurrence 20,000km ² or area of occupancy <2,000km ² + two of the following: - severely fragmented or no more than 10 locations - continuing decline - extreme fluctuations
C. Small population and declining	<250 mature individuals, population declining	<2,500 mature individuals, population declining	<10,000 mature individuals, population declining
D. Very small population	<50 mature individuals	<250 mature individuals	D1. <1,000 mature individuals
D2. Very small area of occupancy		D2. <20km ² or 5 or fewer locations	
E. Quantifiable probability of extinction	>50% within 10 years or three generations	>20% within 20 years or five generations	>10% within 100 years