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 :

S1013: *Vertigo geyeri* - Geyer's whorl snail

S1013 *Vertigo geyeri* Geyer's whorl snail

Audit trail compiled and edited by JNCC and the Invertebrate Inter-Agency 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').

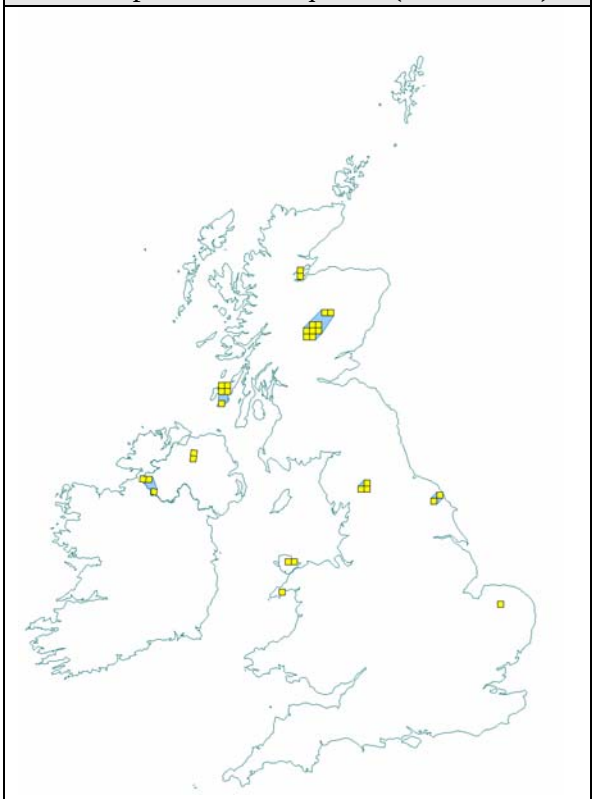
1. Range Information[2.3]

1.1 Surface area of range[2.3.1]

3,823km^2

The above estimate was calculated using records collected from 1990 onwards, within Alpha Hull software. Extent of occurrence was used as a proxy measure for range (see Map 1.1 below), at 10km^2 resolution. The value of alpha was set at 20km to reflect the mobility of this species.

Map 1.1. Current extent of occurrence and occupied 10-km squares (1990-2004)



Data sources provided in Section 6

1.2 Date of range determination[2.3.2]

1990 – 2004

Records from the Mollusc (non-marine) data for Great Britain and Ireland and the Invertebrate Site Register for England (both provided via the NBN Gateway), and additional records provided by the Countryside Council for Wales (A. Fowels, *Pers. comm.*) dated 1990 onwards plus a new site record provided by the Conc. Soc (R. Baker in press), were used to calculate the 'current' extent of occurrence; the most recent records available through these sources were from 2004.

Records from this time period provide the best representation of current range as it is understood by experts.

1.3 Quality of range data[2.3.3]

Good

All known populations have been surveyed during this period and no extinctions have been recorded. Quality of data is therefore considered to be good.

1.4 Range trend[2.3.4] and range trend magnitude[2.3.5]

Unknown

The historical range for this species encompasses most of the British Isles, although (with the exception of a single site in Norfolk); the records from southern England and Wales relate to sub-fossil material, indicating that the species was common in lowland Britain immediately after the last glaciation.

Living populations were only discovered in 1978 (in the Lake District) and it wasn't until 1994 that surveys began to reveal that *V. geyeri* survived more widely in the UK. From records alone, it could be claimed that the spate of recent discoveries represents an 'increasing' trend. However, this is attributed purely to increased survey effort; there is no evidence on which to determine 'real' trends in range in modern times. It is possible that some undiscovered populations may have become extinct, but it is also feasible that further populations will be discovered.

For this reason, it is most appropriate to assess the trend as unknown at this time.

1.5 Range trend period [2.3.6]

Not applicable

1.6 Reasons for reported trend in range[2.3.7]

Not applicable

1.7 Favourable reference range[2.7.1]

3,823km^2 (Equal to current)

Based on the decision tree in Note 1 (see 'Assessing Conservation Status: UK Approach') and a professional understanding of the species, current range is considered sufficiently large to support the species in the long term. Current extent is therefore a suitable baseline for the favourable reference value.

1.8 Range conclusion[2.8]

Favourable

Although current trends are unknown, it is likely that further populations await discovery. Since the current range estimate is equivalent to the favourable reference range, the conclusion for this parameter is Favourable.

2. Population of the Species[2.4]

2.1 Population estimate[2.4.1]

59 occupied 1-km squares

This species is known to occupy 59 1-km squares across 35 sites in the UK (refer to Table 2.1 below and Baker et al 2007).

Several of the Scottish sites consist of large expanses of open hillside where *V. geyeri* occurs in numerous highly-localised seepages, often at some distance from one another. Most populations, with the notable exception of those in Northern Ireland and western Scotland, occur within designated sites.

Table 2.1 UK population

Country	Populations (no. of sites)	No. of occupied 1km squares	Accuracy	Data Source/ Comments
England	8	11	Partial survey	Further discoveries are possible in the calcareous uplands of northern England and in calcareous fens in East Anglia
Scotland	17	32	Partial survey	Scottish populations are concentrated in Perthshire, Deeside, Islay and Black Isle. Several of the Perthshire populations occupy seepages on extensive tracts of hillside
Wales	3	5	Partial survey	Relatively little of Wales is on calcareous geology so the possibilities for discovery of more populations are slight
Northern Ireland	6	10	Partial survey	More populations probably remain to be discovered in Northern Ireland
UK Total	34	58	Partial survey	See References for data sources

SOURCE: 2005 UK Biodiversity Action Plan reporting, and 2006 surveys

2.2 Date of population estimate[2.4.2]

2006

2.3 Method of population estimate[2.4.3]

2 = extrapolation from surveys of part of the population, sampling

All known *V. geyeri* populations in the UK have been surveyed, some on several occasions, in the past decade. However a blanket survey of potential sites across the UK has not been undertaken.

2.4 Quality of population data[2.4.4]

Moderate

Whilst population estimates (in terms of density of individuals/m2) have been made for some extant sites, difficulties in sampling efficiency and natural population fluctuations year on year make estimates of population size of limited value. It is feasible to consider populations as containing an abundance of individuals or to say that repeated sampling indicates only a relatively small population is present, beyond that quantitative estimates are potentially misleading.

2.5 Population trend[2.4.5] and population trend magnitude[2.4.6]

Stable

Population size is very difficult to assess for this species, given massive annual fluctuations and behavioural responses to climatic conditions that affect sampling efficiency. Where quantitative samples have been taken on repeat occasions comparable densities of individuals/m^2 have been recorded. It is, therefore, reasonable to assume that overall the UK population is currently stable.

However, in Scotland, there are concerns over habitat quality on the Black Isle and in Islay, most Scottish populations are sympathetically managed and likely to be stable. In Wales, two of the three localities suffer from under-grazing and those populations are likely to be declining (the third (strongest) population appears to be relatively stable).

There is no evidence to suggest that there have been any significant changes to population size in either England or Northern Ireland (2005 UK Biodiversity Reporting System and other 2006 surveys).

2.6 Population trend period[2.4.7]

2002 – 2005

The last Biodiversity Action Plan reporting round (2002-2005) provided definitive population trend data. There is less certainty about post-1994 trends.

2.7 Reasons for reported trend in population[2.4.8]

Not applicable

2.8 Justification of % thresholds for trends[2.4.9]

Not applicable

2.9 Main pressures[2.4.10]

810 Drainage (changes in hydrology)
140 Grazing (alterations to grazing regimes)
101 Modification of cultivation practices (over-shading through lack of management)

2.10 Threats[2.4.11]

810 Drainage (changes in hydrology)
140 Grazing (alterations to grazing regimes)
101 Modification of cultivation practices (over-shading through lack of management)

2.11 Favourable reference population[2.7.2]

59 occupied 1-km squares (equal to current)

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').
From what is understood of *V. geyeri*, and based on Note 1, current populations are considered sufficient to ensure the long-term viability of the species. The current estimate is therefore a suitable baseline for the favourable reference value.

2.12 Population conclusion[2.8]

Favourable

Trends in population are extremely difficult to assess in this species. However, although some outlier populations are small and vulnerable, overall, it appears that *V. geyeri* populations are stable. Since the current estimate is also equivalent to the favourable reference population, the conclusion for this parameter is Favourable.

3. Habitat for the Species in the Biogeographic Region or Sea[2.5]

V. geyeri is mostly recorded on permanently wet calcareous flushes on gently sloping, sometimes stony ground with a low-growing vegetation. This habitat is dominated by fine-leaved grasses, sedges and other vegetation such as *Carex spp*., *Schoenus nigricans, S. ferrugineus* and *Eleocharis quinqueflora*. Mosses such as *Ctenidium molluscum* and *Cratoneuron* spp. are also present in the immediate area. *V. geyeri* can be found at the moist base of the sedge or bog-rush. These flushes are often tufa depositing. In many cases the vegetation is kept short by grazing sheep and cattle. The snails have an annual life-cycle and probably feed on micro-fungi growing on decaying plant material in the litter layer.

3.1 Surface area of habitat[2.5.2]

Unknown

3.2 Date of estimation[2.5.3]

Not applicable

3.3 Quality of data on habitat area[2.5.4]

Poor

The habitats used by this species have been relatively well surveyed and documented. However, because there is no data specifically relating to area of habitat used, quality of data is recorded as poor rather than moderate.

3.4 Habitat trend[2.5.5]

Stable

Historically, fens have declined in area and quality as a result of drainage, overgrazing and scrub encroachment. However, this trend has been slowed and even reversed in more recent years, as awareness of this species has increased, and subsequently management as become more focused. Since 1994, habitat for this species has, most likely, remained stable.

3.5 Habitat trend period[2.5.6]

1994 – 2006

3.6 Reasons for reported trend in habitat[2.5.7]

Not applicable

3.7 Suitable habitat for the species (in km^2)[2.7.3]

Unknown

3.8 Habitat conclusion[2.8]

Favourable

V. geyeri predominantly occurs in high quality calcareous seepages and fens in the UK, where its conservation is linked to maintaining appropriate habitat for botanical diversity. Although habitat has suffered declines historically, these are now being reversed. The fact that the species appears to be thriving in the majority of its UK localities suggests that habitat condition, overall, is currently Favourable.

4. Future Prospects[2.6]

Good prospects

"Species is expected to survive and prosper".

This species has been the subject of a species action plan under the UK Biodiversity Action Plan, and is included on the revised UKBAP list.

The majority of surviving localities for *V. geyeri* in the UK are calcareous seepages on limestone hillsides. These tend to support botanical communities that have attracted conservation designation and as such many populations occur within SSSIs. These localities can be considered to be relatively secure and as long as appropriate management is maintained then *V. geyeri* should survive. A proportion of sites, however, consist of calcareous fen meadow with shallow seepages and these are more at risk from drainage and management neglect. In general, they tend to be geographical outliers (e.g. Norfolk, Wales and Islay) and hence the loss of these populations would have a significant impact on range.

Hydrology is vitally important and a continuous supply of water is essential for the maintenance of habitat conditions. Changes to the climate that cause alterations to rainfall supply could have a significant impact on the viability of this species in the UK. Current predictions suggest that future rainfall in northern and western Britain should not cause a reduction to groundwater supplies, but populations in southern England would be at considerable risk.

Although some threats to this species have been identified, it is not "likely to struggle unless conditions change". Rather, the species is only likely to struggle if conditions do change, the timescale and eventuality of this is unknown. Expert opinion is that it is more appropriate to report prospects as 'good' at this time.

4.1 Future prospects conclusion[2.8]

Favourable

5. Overall Conclusion [2.8]

Favourable

All parameters have been assessed as Favourable. It therefore follows that the overall conclusion is also Favourable.

Table 5.1 Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
Range	Favourable	Current range is not smaller than the favourable reference range. Trends are unknown. However, it is expected that more populations will be discovered in coming years.	2
Population	Favourable	Trend is stable, and the current population is not lower than favourable reference population.	2
Habitat	Favourable	Area of habitat is sufficiently large (and stable or increasing), and habitat quality is suitable for, the long term survival of the species	2
Future Prospects	Favourable	Main pressures and threats to the species not significant; species will remain viable on the long-term	2
Overall Assessment	Favourable	All Favourable	2

*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

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Map Data Sources:

BAKER, R., HOLYOAK, G. & HOWLETT, D. (in press). Whorl snails of genus Vertigo in Norfolk. Transactions of the Norfolk and Norwich Naturalist's Society. **40**(1).

Conchological Society - Mollusc (non-marine) data for Great Britain and Ireland; Natural England - Invertebrate Site Register (via the NBN Gateway).

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