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 :

S1014: *Vertigo angustior* - Narrow-mouthed whorl snail

S1014 *Vertigo angustior* Narrow-mouthed 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').

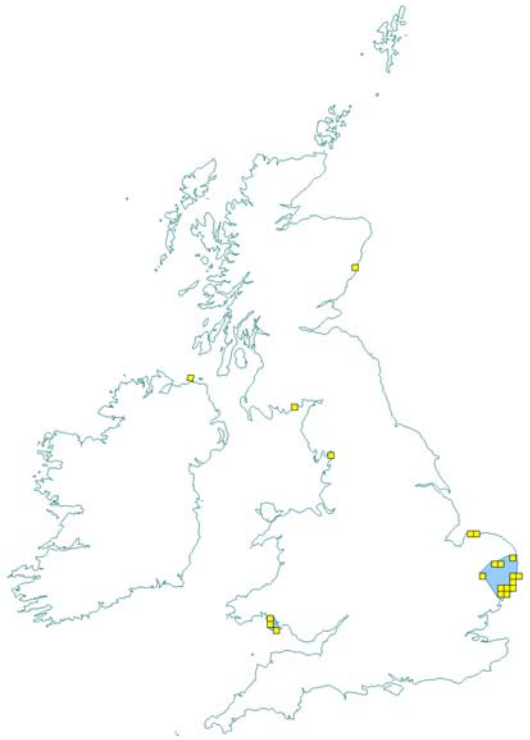
1. Range Information[2.3]

1.1 Surface area of range[2.3.1]

5,969 km^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 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 (1990-2006)



Data sources provided in Section 6

1.2 Date of range determination[2.3.2]

1990 – 2006

Records from the Mollusc (non-marine) data for Great Britain and Ireland and the Invertebrate Site Register for England (both provided on the NBN Gateway), and additional records provided by the Countryside Council for Wales (A. Fowles, pers. comm.) dated 1990 onwards, were used to calculate the current extent of occurrence.

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

Records in modern times are insufficient to determine trends in range.

Discoveries of new populations in recent years have extended the known range (including areas Northern Ireland, North-east Scotland and East Anglia), which suggests that more populations are likely to be found in the future. However it is possible that some undiscovered populations may have become extinct. A true range trend (i.e. not influenced by survey effort) is therefore not known.

1.5 Range trend period [2.3.6]

1994 – 2006

1.6 Reasons for reported trend in range[2.3.7]

Not applicable

1.7 Favourable reference range[2.7.1]

5,969km^2 (Equal to current)

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').

Current trend in range is unknown. However, the pre-glacial range for this species (as determined by fossil records) encompasses an area similar to the current range. North-western Scotland and the Thames estuary are exceptions to this. These losses are generally considered to have occurred in the mid-Postglacial period and no extinctions have been documented since the species was first described in 1830. Discoveries of new populations in recent years have extended the known range (including areas Northern Ireland, North-east Scotland and East Anglia), which suggests that more populations are likely to be found in the future.

Based on this and Note 1, the current range is considered to be sufficiently large to support extant populations for the foreseeable future, and thus the favourable reference range has been set as equal to current.

1.8 Range conclusion[2.8]

Favourable

Current range is not smaller than the favourable reference range. Hence, in accordance with Annex C, range has been assessed as Favourable.

2. Population of the species[2.4]

2.1 Population estimate[2.4.1]

54 1-km squares

This species is known at 54 sites (1-km squares) across the UK (refer to Table 2.1 below), occupying a total of 21 10km-squares (see Map 1.1).

Table 2.1. UK population

Country	Populations	No. of occupied 1km squares	Accuracy	Data Source/ Comments
England	19	43	Partial survey	The East Anglian estuary complex is regarded here as comprising 12 populations, although feasibly they could all be considered as belonging to a single population. There must be a strong likelihood that more sites will be found to support this species along the coast of southern England
Scotland	2	3	Partial survey	The two localities on coastal cliffs in Aberdeenshire are considered here as one population. It seems likely that more populations await discovery in Scotland
Wales	3	5	Partial survey	Further populations might await discovery
Northern Ireland	2	3	Partial survey	Occurs in two separate bays at Giant's Causeway, but they are considered here as one population. More populations probably remain to be discovered in Northern Ireland
UK Total	26	54	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 *Vertigo angustior* populations in the UK have been surveyed in the past decade, some on several occasions. 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/m^2) have been made for some extant sites, difficulties in sampling efficiency and natural population fluctations 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.

In Scotland, both populations are rather small and hence the continued decline in abundance at Whiteport (due to natural succession and coastal erosion) affects a significant proportion of the overall number of individuals in Scotland. In England, Northern Ireland and Wales, there has been no evidence to suggest significant changes to population size.

2.6 Population trend period[2.4.7]

2002 – 2006

The trend reported is based on information collected for the 2002-2005 biodiversity reporting round.

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]

950 Biocenotic evolution - Natural succession leading to over-shading in fen and saltmarsh habitats
900 Erosion - Coastal erosion destroying sand dune habitat
140 Grazing - Under-grazing in fen and fen meadow habitats

2.10 Threats[2.4.11]

140 Grazing - Under-grazing in fen and fen meadow habitats
950 Biocenotic evolution - Natural succession leading to over-shading in fen and saltmarsh habitats
900 Erosion - Coastal erosion destroying sand dune habitat
930 Submersion - Sea-level rise potentially reducing availability of habitat on sea embankments

2.11 Favourable reference population[2.7.2]

54 1km- squares

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').

At the UK level, populations are considered to be stable. Despite massive annual fluctuations, they are considered sufficiently widespread and robust not to be at high risk from stochastic events. Therefore, based on expert opinion and the UK approach, the favourable reference population has been set as equivalent to current.

2.12 Population conclusion[2.8]

Favourable

Current population not lower than favourable reference population and [based on expert opinion] reproduction, mortality and age structure does not deviate from normal. Hence, in accordance with Annex C, population has been assessed as Favourable.

Trends in population size are extremely difficult to assess in this species. However, populations at the majority of known sites are currently considered to be viable in both size and structure.

3. Habitat for the species in the Biogeographic region or sea[2.5]

V. angustior is found primarily in open, damp habitats on friable soils that are kept moist by shading from moderately tall herbaceous or grassy vegetation. Although it requires microhabitats with high humidity levels it is not tolerant of deep or prolonged inundation. Drought causes the snails to retreat to within the soil and they are generally absent from habitats that have dry substrates for long periods of the summer. The vegetation may be grazed by livestock, although over-grazing can be detrimental. The snails have an annual life-cycle and probably feed on micro-fungi growing on decaying plant material in the litter layer. In the British Isles it has been found in wet base-rich meadows, in coastal marshes, dune slacks and maritime turf, and in depressions within limestone pavement; several of these habitats are listed on Annex I of the Habitats Directive. In the UK the largest known populations are found around the margins of estuaries in east Anglia, where the species occupies mats of fescue and other fine-leaved grasses just above high water mark. Elsewhere in Europe calcareous fen is the species' most typical habitat. Because of its specific microhabitat requirements, the species is often restricted to a narrow zone around wetlands, only a few metres wide.

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, the habitat used by this species has suffered declines in area and quality as a result of natural succession, coastal erosion (destroying sand dune habitat), and under-grazing of fen and fen meadow habitats. However, this trend has been slowed and even reversed in more recent years, as awareness of this species has increased, and subsequently management has become more focussed. Since the Habitats Directive came into force, expert opinion is that habitat quality and area has 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 km2)[2.7.3]

Unknown

There is currently no estimate for the area of suitable occupied and unoccupied habitat.

3.8 Habitat conclusion[2.8]

Favourable

Although area of habitat currently used by the species is unknown, expert opinion is that "area of habitat is sufficiently large (and stable or increasing) and habitat quality is suitable for the long term survival of the species". Hence, in accordance with Annex C, habitat has been assessed as Favourable.

A few populations, such as those at Oxwich, Whiteport, and Flordon Common, occur in habitat that is currently regarded as being in poor condition for *V. angustior*. However, most populations occur in habitat that would appear to be ideal.

4. Future Prospects[2.6]

Good prospects

"Species 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.

Most of the traditional sites known for the narrow-mouthed whorl snail in the UK are considered to be in good condition and are generally maintained by environmental conditions that slow down or prevent natural succession, such as wave action on the coastal fringe in Scotland and Northern Ireland.

Away from these supra-littoral ecotones, management is usually dependent upon low-intensity grazing (though at Gait Barrows substrate prevents widespread scrub encroachment) and establishing good condition habitat requires the implementation of a sympathetic grazing regime.

Sea-level rise will almost certainly cause problems for the populations alongside East Anglian estuaries and is probably implicated in the erosion of dune front habitats at

Whiteport in Scotland. It is possible that the Scottish population is beyond recovery but in East Anglia managed coastal retreat offers substantial possibilities to create good quality habitat for *V. angustior* to occupy in the future.

Although some threats to this species have been identified, it is not "likely to struggle unless conditions change". Moreover, 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]

Unfavourable – Inadequate

Although prospects have been reported as good, it does not follow that the conclusion for this parameter can be Favourable. This is because, although the species is not currently "likely to struggle unless conditions change", experts can not confidently report that "threats to the species will not be significant [and, that the] species will remain viable in the long-term".

Paradoxically, the discovery of extensive new populations of this species on sea embankments of East Anglian estuaries has changed perceptions of future prospects from Favourable to Inadequate. This is because the bulk of the UK population is now known to occur in this habitat and there are uncertainties over the impact of predicted sea-level rise and the effectiveness of managed coastal retreat.

Sea embankments are the occupied habitat in 35 of the 54 1-km squares presently known to be occupied by *V. angustior* in the UK and significant losses here would substantially reduce the overall UK population.

The assessment for this parameter is therefore Unfavourable – Inadequate.

5. Overall Conclusion [2.8]

Unfavourable – Inadequate

Range was Favourable, population was Favourable, and habitat was Favourable. However, future prospects were Unfavourable – Inadequate. Hence, in accordance with Annex C, the overall assessment is Unfavourable – Inadequate.

Table 5.1 Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
Range	Favourable	Range is not smaller than the favourable reference range	1
Population	Favourable	Population is not lower than favourable reference population AND [based on expert opinion] reproduction, mortality and age structure are not deviating from normal	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	Unfavourable – Inadequate	Although species is not "likely to struggle unless conditions change", sea-rise may affect long-term viability.	3
Overall Assessment	Unfavourable – Inadequate	One or more Unfavourable – Inadequate but no Unfavourable – Bad	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

CAMERON, R.A.D. 2003. Life-cycles, molluscan and botanical associations of *Vertigo angustior* and *Vertigo geyeri* (Gastropoda, Pulmonata: Vertiginidae). *Heldia,* **5**: 95-110.

CAMERON, R.A.D. et al. 2003. Species Accounts for snails of the genus *Vertigo* listed in Annex II of the Habitats Directive: *V. angustior*, *V. genesii*, *V. geyeri* and *V. moulinsiana* (Gastropoda, Pulmonata: Vertiginidae). *Heldia,* **5**: 151-170.

COYLE, S.P. 1996. *The distribution and ecology of the snail Vertigo angustior at Gait Barrows NNR, Lancashire.* Unpublished B.Sc. dissertation, University of Lancaster.

FOWLES, A.P. 1998. Implementing the Habitats Directive: *Vertigo angustior* Jeffreys in Wales. In: *Molluscan conservation: a strategy for the 21st Century.* Journal of Conchology. **Special Publication No. 2.** Eds. I.J. KILLEEN, M.B. SEDDON, & A.M. HOLMES, pp. 179-190. Conchological Society of Great Britain and Ireland.

KILLEEN, I.J. 1993. *The distribution and ecology of the snail Vertigo angustior at Oxwich and Whiteford Burrows NNRs, Gower, South Wales.* CCW Contract Science. **20**. Countryside Council for Wales.

KILLEEN, I.J. 1997. *Survey for the terrestrial snail Vertigo angustior at three sites in England (Gait Barrows NNR, Flordon Common and Martlesham Creek).* EN Research Report. **228**. English Nature.

KILLEEN, I.J. 1998. *Surveys of the whorl snail Vertigo angustior in Cumbria & North Lancashire.* Unpublished report. English Nature.

KILLEEN, I.J. 2001. *Surveys of EU Habitats Directive Vertigo species in England: Vertigo angustior at Flordon Common SAC, Norfolk and Fritton Marshes pSSSI, Suffolk.* English Nature Research Reports. **419**. English Nature.

KILLEEN, I.J. 2003. A review of EUHSD *Vertigo* species in England and Scotland (Gastropoda, Pulmonata: Vertiginidae). *Heldia,* **5**: 73-84.

KILLEEN, I.J. & Colville, B. 2000. *Survey for the whorl snail Vertigo angustior on the Solway Coast.* Commissioned Reports. **F99AC317**. Scottish Natural Heritage.

KILLEEN, I.J. & Moorkens, E.A. 2004. *Survey to determine the distribution of the narrow-mouthed whorl snail Vertigo angustior around the Blyth Estuary complex, Suffolk.* Unpublished report. Environment Agency.

SHARLAND, E. 2000. *Autecology of Vertigo angustior and Vertigo geyeri in Wales.* CCW Contract Science. **392**. Countryside Council for Wales.

Map Data Sources

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

Vertigo spp dataset compiled by A. Fowles, Countryside Council for Wales (pers. comm.)