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

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the conservation status assessment for the species:

S1014 - Narrow-mouthed whorl snail (*Vertigo angustior*)

SCOTLAND

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this species is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).
- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

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NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Scotland information only)**
1.2 Species code	**1014**
1.3 Species scientific name	**Vertigo angustior**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Narrow-mouthed whorl snail

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2012-2017
2.3 Distribution map	Yes
2.4 Distribution map Method used	Based mainly on extrapolation from a limited amount of data
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?	No	
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

Killeen, I., M. Willing & E. Moorkens. 2018a. Monitoring of Vertigo snail features at sites in Scotland: Vertigo angustior. Scottish Natural Heritage report.
Killeen, I.J. 2013a. Whorl snails (Vertigo spp.) surveillance in Scotland: A condition assessment of the narrow-mouthed whorl snail Vertigo angustior in Aberdeenshire. Scottish Natural Heritage report.
Marriott, R.W. & Colville, B. 2011. Monitoring the Narrow mouthed whorl snail Vertigo angustior at White Port SSSI, Kircudbrightshire. Scottish Natural Heritage report.
Littlewood, N.A. & Stockan, J.A. 2012. Surveillance of priority terrestrial invertebrates in Scotland. SNH report.
Moorkens, E.A. & Killeen, I.J. 2011. Monitoring and Condition Assessment of Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Manuals, No. 55. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
MIDAS - Management Information on Designated Areas in Scotland (SNH)
Killeen, I.J & Colville, B. 2000. Survey for the whorl snail Vertigo angustior on the Solway coast. Scottish Natural Heritage Report.
Moorkens, E., Killeen, I. & Seddon, M. 2012. Vertigo angustior. The IUCN Red List of Threatened Species 2012: e.T22935A16658012.
Pokryszko, B.M. 1990. The Vertiginidae of Poland (Gastropoda: Pulmonata: Pupiloidea) - a systematic monograph. Annales Zoologici 43: 133-257.
Pokryszko B.M. 1987. On the aphally in the Vertiginidae (Gastropoda: Pulmonata: Orthurethra). Journal of
Conchology 32, 365-376.

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5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Decreasing (-)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	Genuine change Improved knowledge/more accurate data The change is mainly due to:	Genuine change
5.12 Additional information	The White Port site has been destroyed by coastal erosion.	

6. Population

6.1 Year or period	2017	
6.2 Population size (in reporting unit)	a) Unit b) Minimum c) Maximum d) Best single value	number of map 1x1 km grid cells (grids1x1) 2
6.3 Type of estimate	Best estimate	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit b) Minimum c) Maximum d) Best single value	
6.5 Type of estimate		
6.6 Population size Method used	Based mainly on extrapolation from a limited amount of data	
6.7 Short-term trend Period	2012-2017	
6.8 Short-term trend Direction	Decreasing (-)	
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.10 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data	

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6.11 Long-term trend Period	
6.12 Long-term trend Direction	
6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.14 Long-term trend Method used	
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size b) Operator c) Unknown d) Method
6.16 Change and reason for change in population size	Genuine change The change is mainly due to: Genuine change
6.17 Additional information	The White Port site has been destroyed by coastal erosion. We have no information on mortality, age structure and reproduction.

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	Unknown
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Unknown
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on expert opinion with very limited data	
7.3 Short-term trend Period	2012-2017	
7.4 Short-term trend Direction	Decreasing (-)	
7.5 Short-term trend Method used	Based mainly on expert opinion with very limited data	
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		
7.9 Additional information	The White Port site has been destroyed by coastal erosion.	

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Other human intrusions and disturbance not mentioned above (H08)	M
Other climate related changes in abiotic conditions (N09)	M
Sea-level and wave exposure changes due to climate change (N04)	M
Change of species distribution (natural newcomers) due to climate change (N08)	M

Change of habitat location, size, and / or quality due to climate change (N05)	M
Extensive grazing or undergrazing by livestock (A10)	M
Modification of hydrological flow or physical alteration of water bodies for agriculture (excluding development and operation of dams) (A33)	M
Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization) (L01)	M

Threat	Ranking
Other human intrusions and disturbance not mentioned above (H08)	M
Other climate related changes in abiotic conditions (N09)	M
Sea-level and wave exposure changes due to climate change (N04)	M
Change of species distribution (natural newcomers) due to climate change (N08)	M
Change of habitat location, size, and / or quality due to climate change (N05)	M
Extensive grazing or undergrazing by livestock (A10)	M
Modification of hydrological flow or physical alteration of water bodies for agriculture (excluding development and operation of dams) (A33)	M
Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization) (L01)	M

8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures

a) Are measures needed? Yes

b) Indicate the status of measures: Measures identified and taken

9.2 Main purpose of the measures taken

Maintain the current range, population and/or habitat for the species

9.3 Location of the measures taken

Both inside and outside Natura 2000

9.4 Response to the measures

Short-term results (within the current reporting period, 2013-2018)

9.5 List of main conservation measures

Other measures related to natural processes (CL04)
Implement climate change adaptation measures (CN02)

9.6 Additional information

10. Future prospects

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10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species
10.2 Additional information	Future prospects assessed for the next 12 years. Because of the likely effects of climate change (erosion on the seaward side of the habitat zone) at the existing locations, future prospects are declining/poor. It is unlikely that any practical or feasible mitigation measures could be implemented to prevent erosion, and it is possible the site will disappear in the near future.

11. Conclusions

11.1. Range	
11.2. Population	
11.3. Habitat for the species	
11.4. Future prospects	
11.5 Overall assessment of Conservation Status	
11.6 Overall trend in Conservation Status	
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	2
12.2 Type of estimate	Minimum	
12.3 Population size inside the network Method used	Based mainly on extrapolation from a limited amount of data	
12.4 Short-term trend of population size within the network Direction	Uncertain (u)	
12.5 Short-term trend of population size within the network Method used	Based mainly on extrapolation from a limited amount of data	
12.6 Additional information		

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13. Complementary information

13.1 Justification of % thresholds for trends

13.2 Trans-boundary assessment

13.3 Other relevant Information

Distribution Map

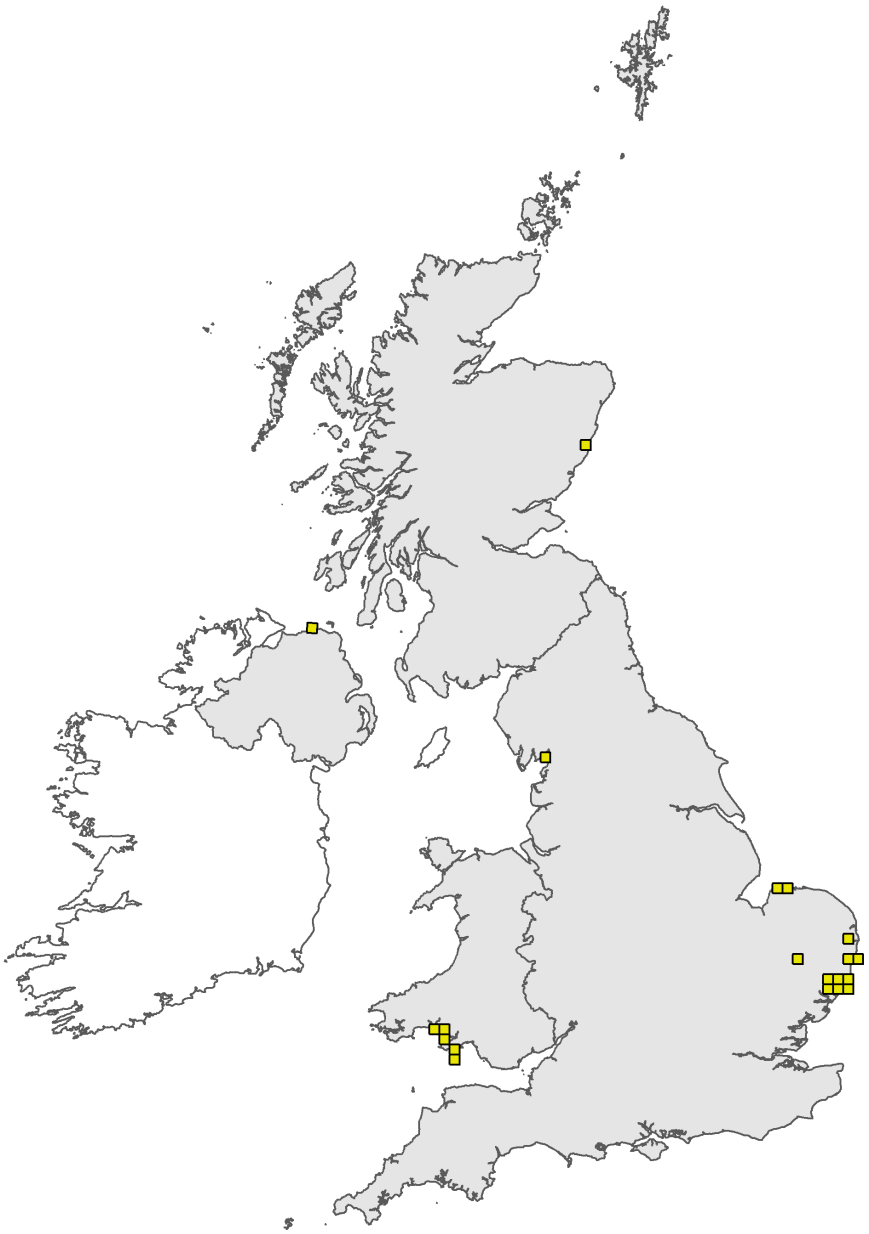

Figure 1: UK distribution map for S1014 - Narrow-mouthed whorl snail (*Vertigo angustior*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

Figure 2: UK range map for S1014 - Narrow-mouthed whorl snail (*Vertigo angustior*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 20km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Vertigo angustior (1014) Region code: ATL

Field label	Note
5.12 Additional information	The White Port site is almost certainly lost as a result of coastal erosion. It is considered unlikely that residual population pockets remain (Killeen 2013a, Killeen et al. 2018a)
6.8 Short term trend; Direction	The population at the White Port location has been under acute threat since 1999 (Killeen & Colville 2000), but the other two sites at Perthumnie Bay, Aberdeenshire, are believed to hold the significant proportion of the overall Scottish population.
6.17 Additional information	It is difficult to assess population size for this species, given the dramatic fluctuations in numbers due to responses to climatic conditions. Population estimates have been made for some sites, but their reliability is limited. Local populations are assessed by presence or absence of snails on repeated sampling; beyond that, quantitative estimates are misleading. The lifecycle of V. angustior remains relatively unknown, and there are no data specific to micro-habitat used. Both populations at Perthumnie Bay are rather small, and their current trend in range is unknown: because of the lost site at White Port, the overall trend in Scotland is decreasing. Long-term trends cannot be determined with any certainty as this species has only been known from Scotland since 1995 (Killeen 2013a, Killeen et al. 2018a). Vertigo species are known to undergo large annual fluctuations in population size and the peak breeding period varies considerably from year to year (Pokryszko 1990). The ability of Vertigo species to self-fertilise significantly increases the probability of survival. By self-fertilisation, the low numbers of individuals are able to reconstruct or restore a population in a few weeks, and a single coloniser is able to establish a new population (Pokryszko 1987).
7.9 Additional information	Historically, the habitat used by this species has suffered declines in area and quality as a result of natural succession, coastal erosion, and under-grazing. However, except for natural-occurring erosion, this trend has been slowed and even reversed in recent years, as management has become more sympathetic (Moorkens & Killeen 2011, Littlewood. & Stockan 2012, Killeen 2013a, Killeen et al. 2018a). In Scotland the species is known only from two coastal locations in south Aberdeenshire: Garron Point and Red Man Bay. The Population on Garron Point was widespread and abundant, and the extent of habitat has not changed since 2012. At Red Man Bay, erosion of the seaward margin of the transition zone has had a negative impact on the extent and quality of the habitat (Killeen et al. 2018a). In the long term, possible losses of habitat from sea-level rise threaten populations in Scotland and elsewhere (Moorkens et al. 2012)