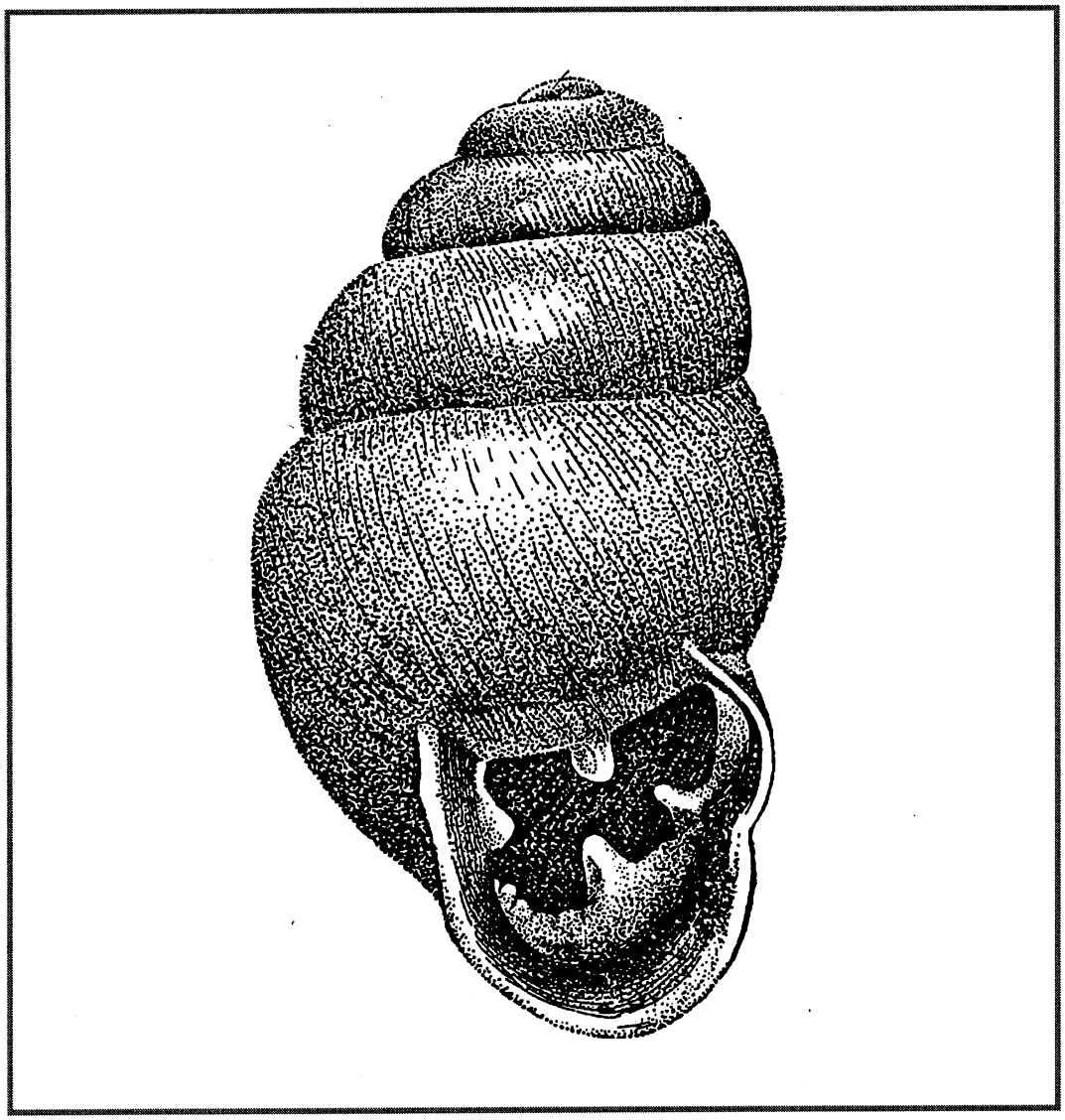
ENGLISH NATURE

Vertigo moulinsiana surveys and studies commissioned in 1995-96

No. 217 - English Nature Research Reports



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English Nature Research Report

No. 217

Vertigo moulinsiana - surveys and studies commissioned in 1995 - 6

Edited by C. Martin Drake

1997

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Contents

Preface

Vertigo moulinsiana is a small rare wetland snail that has been included in Annex 2 of the Habitats and Species Directive. The directive requires that Special Areas of Conservation (SAC) are designated to contribute to maintaining the favourable conservation status of the species. The initial selection of sites made in 1993 was on the basis of existing knowledge. However, at about the same time as candidate SACs were being considered, the existence of a potentially large population in the Kennet valley was brought to the attention of English Nature. This prompted a series of surveys and other studies that altered the perception of sites important for *Vertigo moulinsiana*. These reports are brought together in this volume.

In addition to work funded by English Nature, surveys were carried out during 1996 by other organisations (Willing, M.J. 1996. *Field survey of selected sites on the route of the proposed Newbury bypass (16 March 1996.)*, Friends of the Earth; Killeen, I.K. 1996, *A34 Newbury bypass - factual report, Survey for the snail* Vertigo moulinsiana. Highways Agency).

For reference purposes, the reports should be refered to by the original author and year they appeared.

Nominated officers:

C M Drake, Peterborough (for surveys by Chatfield - Itchen, Chilbolton; Kirby; Killeen - further Avon, Bourne)
G Steven, Newbury (Killeen - Kennet & Lambourn)
A Burn, Peterborough (Killeen - Avon).

Survey for *Vertigo moulinsiana* at Chilbolton Common

J. Chatfield, 1995

Introduction

Chilbolton Common was proposed as a candidate SAC to represent *Vertigo moulinsiana* in the south-west of its range. In the absence of good data, this survey was commissioned to establish the strength of the population here.

The site was visited with John Davis (English Nature, Lyndhurst) on 17 March 1995 in bright but cold weather with wintry showers and high winds.

Sites

1. Ditch, wet common along river with sedges. Scattered trees included ash which may be important in providing shade in summer as well as their leaves augmenting the litter layer. The extent of *the Carex* fen was shown on the map as area ' I'. *V. moulinsiana* was found alive on *Carex riparia* in several spots within this area where it was reasonably abundant; at least 20 individuals were found here.

2. Across river in the north-east corner. Area II on map. The habitat had a different character, with great tussock sedge *Carex paniculata* and others. *Vertigo antivertigo* but not *V. moulinsiana* was found.

3. Along river from Joy Lane on the opposite side to site 1. Marked III on map. *Vertigo* was not common on this side of the river but juveniles were located in *Carex riparia.*

4. Western arm of river.

5. Fishing path across stile with *Phragmites* and tussock sedge.

6. Wooded strip by river near other entrance to the site.

Results

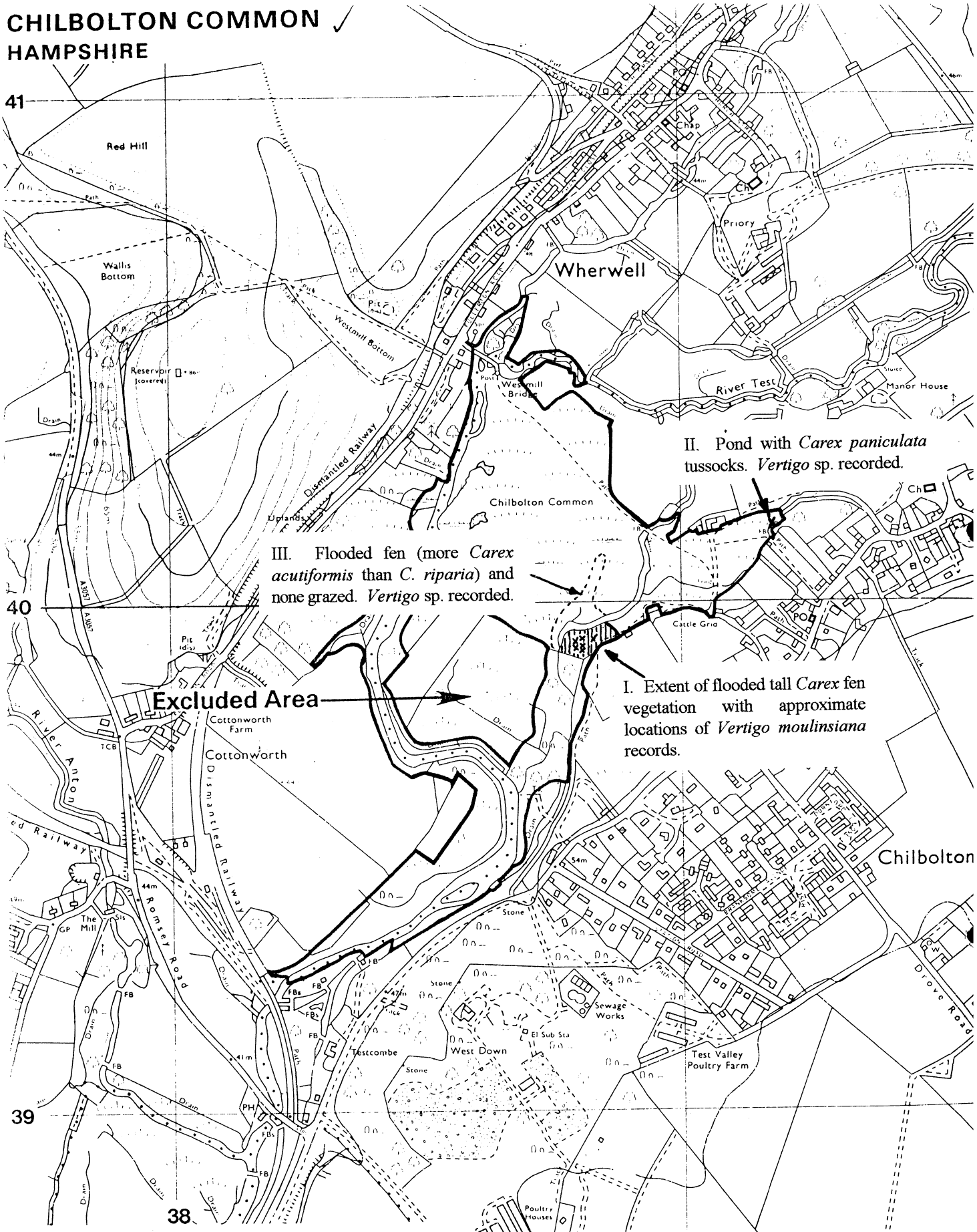
Field identifications							
	1	2	3	3	3	3	notes
Carychium tridentatum				*			
Physa sp		a					
Lymnaea truncatula	a						
Lymnaea peregra		a					
Bathyomphalus contortus				*			
Succinea putris	a	a	a				abundant
Cochlicopa lubrica	*	*		*			shells only, not common
Columella edentula		a					on log under ash

Field identifications							
Vertigo moulinsiana	a						Locally abundant in *Carex riparia*. Animals attached to lower parts of sedge, semi-dry. Sometimes beaten out of sedge. At least 20 seen alive, most released.
V. antivertigo		a	a				in Great Tussock Sedge
Vallonia pulchella	*						fresh shell
Vitrea crystallina		*			*		shells
Nesovitrea hammonis	a						in short vegetation by river
Aegopinella pura		*					
A. nitidula		a					
Zonitoides nitidus	a					a	
Deroceras laeve		a					
Ashfordia granulata	a	a	a	a	a		abundant in sedges at edge of wet area
Trichia striolata						*	
T. hispida	a		a	a		a	
Cepaea hortensis	a	a	a	a	a		some are the dark-lipped form
Pisidium sp.							site not recorded

a - alive; * - condition not recorded.

Results of litter sorting	
Site 2 - north-east corner *Carychium tridentatum* *Succinea putris* *Columella edentula* abundant and mostly juveniles *Vertigo antivertigo* juvenile *Punctum pygmaeum* *Discus rotundatus* *Euconulus fulvus* - one shell only *Trichia hispida* *Pisidium* Site 2 under ash tree *Carychium tridentatum* *Succinea putris* *Columella edentula* *Punctum pygmaeum* *Discus rotundatus* *Vitrea crystallina* *Aegopinella nitidula* *Oxychilus* sp. *Trichia hispida*	Site 2 - sedge litter by river *Carychium minimum* *Lymaea palustris* *Anisus vortex* *Succinea putris* *Cochlicopa lubrica* *Columella edentula* *Vertigo substriata* - one dead shell *V. moulinsiana* - 3 adults *V. antivertigo* - quite abundant - distinctive on account of dark maroon glossy shell. *Punctum pygmeum* *Discus rotundatus* *Nesovitrea hammonis* *Zonitoides nitidus* *Trichia hispida* - large numbers of hatchlings Site 4 - willow litter by river *Carychium minimum* *Lymnaea truncatula* *Succinea putris*

CHILBOLTON COMMON ✓
HAMPSHIRE



NATURE CONSERVANCY COUNCIL

Site boundary thus ——

Scale 1:10 000

0 Metres 600

0 Yards 600

Field work on the River Itchen to search for *Vertigo moulinsiana*, 26/27 March 1996

J. Chatfield, 1996

Introduction

Searches were made at various localities suggested by English Nature as being possible sites for the snail *V. moulinsiana* along the River Itchen. Other molluscs were noted in passing to assess species assemblages and moisture. The weather was cold on both days but damp on 26 March and sunny and dry on 27th. Beating *Carex* was effective on 27 March.

Localities visited

26 March 1995

1. **River Itchen at the Itchen Valley Country Park.** Meander loop at 41/455159. There were some patches of *Carex* but it was not extensive and, from the shells of snails found, not particularly moist year round. *Zonitoides nitidus*, a marsh species, was found only in a wet gully. Litter sample taken.

2. **Decoy Covert** 41/457167. Very few areas of *Carex* by the river. Litter sample taken.

3. **Mariners Meadow** 41/476239. Patches of sedge in meadow and by the river, but not very dense. Litter sample taken.

4. **River north of Brambridge House** 41/465224 - 41/470233. A reasonably wide patch of *Carex* along the river bank once clear of the trees. This included tussocks. *Vertigo moulinsiana* was found in the *Carex* about half way up the leaves but not in an exposed position on the top.

   At the bend in the river, *Pharagmites* takes over but further on there are a few more sedge patches yielding *Vertigo*. A wooded patch with old willows to the landward side of the path was not searched. Some small willows on river bank could provide shelter in hot summer weather.

   Beyond the weir the path crosses the river and is separated from the river by a fenced field currently grazed by sheep. There were sedges along the river bank but they did not extend far out laterally. This area was not investigated because no access permission had been obtained.

27 March 1995

5. **Winnal Moors** 41/494310 - 41/486298

   a. The Winnal Moors reserve owned by Hampshire Wildlife Trust was investigated in the area of gullies with *Carex acutiformis* from immediately over the stile either side of path to river. *Vertigo* was found in these. Beating on to a white tray was successful. There was virtually no wetland bankside vegetation along the river where it is used for fishing.

b. Through the gate to area open to public and owned by Winchester City Council. There is a varied vegetation with tussocks of *Carex paniculata* and also areas with *Glyceria* and *Phragmites*. It appears to be rather wet and soggy. Some *Vertigo* were found in sedge tussocks along the river opposite Coltston Road houses.

6. **Abbots Worthy** 41/497323. Wet meadow with tussock sedge alongside river, reached by the public footpath from the road south of Abbots Worthy. Although an interesting habitat, no *Vertigo* were found in the tussocks, perhaps because it was too dry.

7. **Ovington**

   a. Footpath along river north-west towards Itchen Stoke. No results were obtained from beating tussock sedge, perhaps because the area was too dry and the wrong species of *Carex*. A previous visit to this site did not reveal a strong wetland assemblage of molluscs.

   b. **Ovington Mill** 41/565317. Wet field with ditches of water meadow system. There were many tussocks of sedge but the area was possibly too dry. No *Vertigo* were found in beatings. The water channels were deep-sided.

8. **Weston Court, Bishop's Sutton**. There was no sedge by the river south of railway line. North of railway line 41/597326. This area drains into Alresford Pond. Most of the wetland consists of extensive beds of *Phragmites* and, on higher ground, a flush meadow with *Juncus*. There is a bed of sedges (not tussock) below the railway where the river comes through. Some *Vertigo* found in these.

Comments on *Vertigo moulinsiana*

Vertigo moulinsiana were found alive at Brambridge, Winnal Moors and Weston Court (north of railway line) and they were reasonably abundant at these places. In dry weather (27.3.96), they were beaten out of *Carex* on to a white tray, but in wet weather (26.3.96) they were found by hand searching within the *Carex* plant. On this occasion, they were not exposed on the surface, as they sometimes are, but were hidden in the folds in the sedge leaves.

Brambridge 41/42. A narrow ribbon of *Carex* grows along the bank of the Itchen Navigation by the public footpath. This may have been the site of the record for 'Otterbourne' by Ellis (1926).

Winnal Moors 41/43. The northern section of the reserve provided the strongest colony in several gullies where sedges grew. They were mostly in *Carex acutiformis* but a few were also in *C. paniculata* along the river banks.

Weston Court 41/53. The site is north of the railway and part of the wetland backing on to Alresford Pond, an existing SSSI.

Wetland indicators

Whilst some of the species found were normal terrestrial snails and slugs, the following were indicative of wetland: *Ashfordia granulata, Carychium minimum, Deroceras laeve, Euconulus alderi, Oxyloma pfeifferi, Succinea putris, Vallonia pulchella, Vertigo antivertigo, V. moulinsiana,* and *Zonitoides nitidus.*

Janus (1965) states that *Vertigo moulinsiana* prefers well drained emergent vegetation and does not associate with soggy vegetation. Kerney & Cameron (1978) refer to *Phragmites* as a habitat for *V. moulinsiana*. It is a species of calcareous fens.

Species assemblages

	1	2	3	4	5a	5b	6	7a	7b	8
Freshwater species										
Anisus leucostoma										
A. vortex	*		*		*					
Lymnaea palustris	*		*							
Pisidium sp					*					
Planorbis carinatus	*									
P. planorbis			*							
Terrestrial and marsh species										
Arianta arbustorum	*									
Ashfordia granulata	*		*	*	*	*	*		*	
Carychium minimum					*				*	
Carychium sp.	*									
Cepaea hortensis	*						*	*	*	
C.nemoralis	*									
Cochlicopa lubrica	*				*					
Deroceras laeve	*		*		*					
D. reticulatum	*								*	
Discus rotundatus	*			*	*				*	
Euconulus alden					*					
Euconulus fulvus	*									
Helix aspersa				*						
Lauria cylindracea									*	
Monacha cantiana	*		*							
Oxychilus cellarius	*				*		*			
Oxyloma pfeifferi	*									
Succinea putris	*		*		*			*	*	*
Trichia hispida	*				*	*				*
T. striolata	*		*	*						
Vallonia pulchella	*	*								
Vertigo antivertigo						?*				
V. moulinsiana				*	*					*
V. pygmaea	*									
Zonitoides nitidus	*		*	*	*					

References

ELLIS, A.E. 1926. *British Molluscs*. Oxford: Clarendon.

JANUS, H. 1965. *Land and freshwater molluscs*. Young Specialist Series. London: , Burke.

KERNEY, M.P. & CAMERON, R.A.D. 1979. *A field guide to the land snails of Britian and north-west Europe*. London: Collins.

An assessment of the status and distribution of the terrestrial pulmonate snail *Vertigo moulinsiana* (Dupuy) in the Kennet and Lambourn Valleys, Berkshire

Ian J Killeen, 1996
Malacological Services

January 1996 (amended May 1996)

Contents

1. Summary

Thirty-three wetland sites in the Kennet, Lambourn and Winterbourne valleys were surveyed during this project.

Vertigo moulinsiana was found at 19 of these sites ranging from Knighton to Brimpton on the Kennet and from Weston to Newbury on the Lambourn (see Figure 1).

This area has one of the greatest densities of sites for the snail anywhere in the British Isles and is therefore of national importance for the species.

The habitats at the sites where *V. moulinsiana* was found were all generally similar, but the greatest densities of snails oecurred in open areas of swamp dominated by *Glyceria maxima.* Heavily shaded sites and dense beds of *Phragmites* do not support the species.

The species is conservation-dependent with the main threat coming from lowering the water table. Management of some sites is required to prevent scrub encroachment and over-grazing.

Some monitoring of larger populations is recommended.

2. Introduction

The importance of land and freshwater molluscs as indicator species for assessing sites for conservation and management is now widely recognised. Some mollusc species are particularly useful as environmental indicators of habitats such as ancient woodland and wetlands, and long-established semi-natural habitats such as chalk grasslands or commons. Molluscs may be used to assess the naturalness of an area for conservation since many species are sensitive to disturbance. The more critical species for this aspect of assessment have poor powers of dispersal and hence poor powers of recolonisation.

Vertigo moulinsiana is an inhabitant of mainly calcareous fens. It occurs in long-established swamps, fens and marshes usually bordering rivers and lakes. It lives on both living and dead stems and leaves of tall plants: grasses (eg *Glyceria maxima),* sedges (eg *Carex riparia* and *Cladium mariscus),* and reeds (eg *Phragmites australis*) (Kerney & Cameron, 1979; Bratton, 1991; Killeen, 1992). The species shows a preference for life on taller vegetation upon which it climbs during the season and is rarely found in litter.

It is a European, probably Holarctic species. Although it ranges from Ireland to Russia and south to North Africa, the main populations are in western and central Europe. In Britain *V. moulinsiana* is locally distributed across southern and eastern England from Dorset to north Norfolk with a few isolated colonies elsewhere (see Appendix). The main concentrations are in the Norfolk Broads (Bratton, 1991), but extensive colonies occur in Suffolk (Killeen, 1992) and in the south. Recent recording has revealed previously unknown colonies in Hampshire, Berkshire, Wiltshire and Oxfordshire (Kerney, pers. comm. and pers. obs.). This work had indicated that the Kennet valley in particular was one of the national strongholds for the species. The species has disappeared from many of its former sites during this century.

V. moulinsiana is listed in the British Red Data Book (Bratton, 1991) as an RDB3 (Rare) species, and is scheduled on Annex II of the European Habitats & Species Directive. There is considerable evidence that this species is declining throughout its range. The greatest threats are from changes to local hydrology, drainage of fens and marshes, shading of habitat by scrub encroachment and from change of land use and development. There is also evidence that its decline, particularly in Britain, may in part be due to gradual cooling since the climatic optimum (Bratton, 1991).

This contract was issued by English Nature with the following objectives:

a. To assess the relative importance of the Kennet and Lambourn valleys (Berkshire and Wiltshire) in terms of the national population of *Vertigo moulinsiana*..

b. To determine whether particular parts of the valleys are of special value to the snail.

This report describes and discusses the results of this work and makes recommendations for conservation and management.

3. Sampling and recording procedure

Based on personal experience with *Vertigo moulinsiana* at its known Berkshire sites and elsewhere in the country, the sampling strategy was designed to yield the maximum data on this species within the time available. Searching for the snail was confined to low-lying wetlands with a flora dominated by sedge and *Glyceria*.

In addition to those selected by English Nature, other suitable sites were sought from scrutiny of 1:25,000 OS maps. The opportunity was also taken to examine other potential sites that were spotted whilst driving around.

Initially snails were sought in the field by close examination of the stems and leaves of sedges and *Glyceria*. This was found to be both time consuming and not always reliable at sites where *V. moulinsiana* was living at low density. To increase productivity an additional technique was used. A large sheet of heavy duty blue polythene was spread on the ground at the base of the vegetation. The leaves were then bent over the sheet and beaten with a stick to release all the adhering snails. At sites where *V. moulinsiana* could not be spoiled in the field, the debris was taken away and examined microscopically.

The locations of the sampling stations are marked on the map in Figure 1. Brief descriptions of each site are given in Section 4.

All of the survey work was carried out over 6 days between 30 October and 17 November 1995.

4. Descriptions of sites and sampling stations

Thirty three sites were visited during this survey, and descriptions of each are given below. To avoid excessive repetition in Section 5, much of the data and field observations are included with the site descriptions. Throughout this section reference is made to sedge (*Carex acutiformis* or *C. riparia*) and tussocks (*Carex paniculata*).

4.1 River Lambourn

4.1.1 SU381756

Great Shefford, north of church. Rather dry fen dominated by *Phragmites* with some sedge and *Glyceria* in the damper depressions. **No *V. moulinsiana* found.**

4.1.2 SU383755

Great Shefford, north-east of church. Wooded island between streams with occasional clumps of sedge. **No *V. moulinsiana* found.**

4.1.3 SU397741

Elton Farm, north of Weston. Mixed fen bounded by the river to the south and the farm road to the north. Areas with *Glyceria* swamp and tall sedge with little *Phragmites*. Other places had tall herbs and some alder scrub invasion. ***V. moulinsiana* widespread but sparse.**

4.1.4 SU403737

Weston. Extensive area of open *Glyceria* swamp with standing water on island between two streams to the north of bridge. Some scrub, large tussocks and other sedge with little *Phragmites*. ***V. moulinsiana* very common on *Glyceria*.**

4.1.5 SU411732

Welford. Wet meadow dominated by tall herbs, nettles etc. Sparse patches with sedge, *Glyceria* and *Phragmites*. Few wet depressions. **No V *moulinsiana* found.**

4.1.6 SU418721/2

Easton Farm Meadow SSSI. Grazed meadows with *Juncus* and *Equisetum*. Shallow ditches with strips of sedge and *Phragmites*. **No *V. moulinsiana* found.**

4.1.7 SU430720

Westbrook. Open area of fen bounded by the road and river. Wet depressions with *Glyceria* and sedge, higher areas with tall herbs, nettles and *Phragmites*. ***V. moulinsiana* widespread and very common in the wetter areas.** There was extensive fen to the west of the river, but this was not examined due to difficulty with access.

4.1.8 SU436701

East of Hunt's Green, on north side of river. Extensive open area of swamp with sedges, tussocks, *Glyceria* and *Phragmites* between river and old woodland. Apparently undisturbed. ***V. moulinsiana* very common on a variety of tall vegetation.**

4.1.9 SU452693

Bagnor, Rack Marsh. Swamp with *Glyceria* and sedges on 'island' between rivers. ***V. moulinsiana* very common.** Elsewhere on the site the vegetation is taller and more rank with no evidence of *V. moulinsiana*. The site is managed as an informal nature reserve.

4.1.10 SU455691

Bagnor Bridge. *Glyceria* swamp alongside river. ***V. moulinsiana* abundant.**

4.1.11 SU470683

Donnington. Rather overgrown area of reedbed and swamp on north side of river and bounded by a housing estate. The site is dominated by *Phragmites* and tall herbs with isolated trees and alder scrub. Also deep, swampy ditches with sedges and large tussocks. ***V. moulinsiana* rare: two specimens found on dead leaves of tussock sedges.**

4.2 Winterbourne Stream

4.2.1 SU451699

North of Bagnor. Open, mixed fen alongside stream with tall sedges, large tussocks, etc. Very few depressions with standing water. **No *V. moulinsiana* found.**

4.2.2 SU451707

North of Honeybottom on west side of road. Woodland margin with tall herbs, large tussocks and patches of sedge. **No *V. moulinsiana* found.**

4.3 River Kennet

4.3.1 SU212694

South of Mildenhall. Riverbanks have *Phragmites* along south bank, sedges along north bank backed by managed grass track. Also a ditch with some sedge. Very poor for molluscs, **no *V. moulinsiana* found.**

4.3.2 SU227695

Stitchcombe. Dense sedge bed in ditch on north-east side of lane adjacent to cottage garden. Some sedge patches along the path on south bank of the river. The meadows between the village and the river are grazed grassland with *Juncus* and *Equisetum*. **No *V. moulinsiana* found.**

4.3.3 SU2324698

Axford, west side of lane. Small patch of *Glyceria* and *Phragmites* on south side of river. Abundant sedge and *Glyceria* on north river bank backed by clumps of sedge amongst small alder trees. Much of the sedge was cut, presumably to maintain the site for anglers. **No *V. moulinsiana* found.**

4.3.4 SU271713

Ramsbury. Field with patches of fen with sedges and tall herbs, but with no wet depressions. Luxuriant sedge beds along the bank of the north leg of the river. **No *V. moulinsiana* found.**

4.3.5 SU288713

Knighton. Large meadow with sedge, *Phragmites* and tussock sedge. *Glyceria* swamp in the depressions and ditches. **One specimen of *V. moulinsiana* found in sedge along the north river bank.** Small areas of sedge and *Glyceria* were searched on the south side of the road, but no further *V. moulinsiana* found.

4.3.6 SU301710

East of Knighton. Extensive areas of grazed meadows with *Juncus*, ditches with some sedge and rank fen with tall herbs and sedge. To the south of the river at SU299708 is a field with furrows and rows of sedge and *Phragmites* which may result from management or recent re-colonisation. **One live *V. moulinsiana* was found on sedge at the edge of a small alder woodland bordering the field.**

4.3.7 SU317705

Chilton Foliat (adjacent to, but not within, Chilton Foliat SSSI). Strip of *Glyceria* swamp c400 m long to the north of an area of woodland and bounded by the B4192 road (see Figure 2). ***V. moulinsiana* abundant on stems and leaves.**

4.3.8 SU333687

Hungerford, north-west of church (part of Freeman's Marsh SSSI). Luxuriant clumps of sedge alongside River Dun with occasional tussocks and *Glyceria*. ***V. moulinsiana* scarce.** Also has a low-lying area with tussocks at SU327687 in heavily grazed grassland. **Few *V. moulinsiana* beaten from dead sedge leaves.**

4.3.9a SU384673

Kintbury, a site where *V. moulnsiana* was abundant in 1993. The *Glyceria*-filled ditch has been heavily grazed and there was **no sign of *V. moulinsiana*.**

4.3.9b SU385673

Kintbury, north-west of station. Gently sloping river banks and low-lying meadow with sedge and *Glyceria*. **Several *V moulinsiana* beaten from relatively dry sedge.**

4.3.10a SU425673

Marsh Benham, north of level crossing. Open, mixed woodland on west side of road. The ground cover in the more open areas comprised tussock sedge and *Phragmites*. The wetter depressions had more luxuriant clumps of sedge from which **one specimen of *V. moulinsiana* was retrieved.**

4.3.10b SU427671

Marsh Benham. Small area of fen in comer of field adjacent to railway line. Dominated by *Phragmites* but **too dry for *V. moulinsiana*.**

4.3.11 SU491671

Newbury, Ram Bridge. Swampy strip of *Glyceria* and *Phragmites* between the river and towpath. ***V. moulinsiana* common.**

Sites 4.3.12 to 4.3.15 are all within Thatcham Reed Beds SSSI part of which is also designated as a Local Nature Reserve.

4.3.12 SU499667

Thatcham, north of Bull's Lock. At the south comer is tall, mixed fen with sedge and *Phragmites* in the shade of tall trees and scrub. **No *V. moulinsiana* found.** 100 m further north on the east side of the track is low-lying area of sedge and standing water backed by drier *Phragmites* beds. *V. moulinsiana* very common on sedge stems.

4.3.13 SU505665

Thatcham. Low-lying area of mainly sedge and standing water between railway and Middle Ditch (Figure 3). ***V. moulinsiana* very common on sedge stems.**

4.3.14 SU511663

Thatcham (Compartment 11, eastern segment). Managed sedge fen, cut on rotation according to supplied map. Tall areas of sedge, most of which was flattened, dry in places and relatively impoverished for snails. **Few *V. moulinsiana* beaten from upright sedge in a shallow ditch with standing water.**

4.3.15 SU513663

Thatcham (southern part of Compartment 12). Tall, dry *Phragmites* bed with some sedge along southern boundary. **No molluscs found!**

4.3.16 SU527663

Thatcham Railway Station. Luxuriant stands of sedge and *Glyceria* on north bank of river. **No *V. moulinsiana* found.**

4.3.17 SU556655

Brimpton, north side of road, south of King's Bridge. Low-lying fen dominated by sedge and tussocks in wet depressions. Taller herbs on the drier ground. ***V. moulinsiana* found frequently** by beating, but hard to locate in the field.

4.3.18 SU577666

Woolhampton Reed Beds SSSI. The west part of the reserve is open woodland with areas of sedge, *Phragmites* and tall herbs, whereas the eastern part has rather dry, tall *Phragmites* bed. **No *V. moulinsiana* found** but molluscs were common in the west and very rare in the east.

5. Results and discussion

The lists of the molluscs recorded at each site are tabulated and included as an Appendix at the end of this report. As it was not within the specification of this project to carry out a full molluscan survey, these lists merely record the other species observed in the field or retrieved from litter samples. Voucher specimens of *Vertigo moulinsiana* from selected sites are in the collections of the author and the Berkshire Mollusc Recorder Mr Michael Weideli.

During this survey, 20 sites along an approximately 40 km stretch of the Kennet valley were searched from Mildenhall in Wiltshire to Woolhampton in Berkshire. A further 11 sites in the Lambourn valley downstream of Great Shefford, and two sites on the Winterbourne stream were also surveyed. The results of this work have shown that *V. moulinsiana* is living at 19 sites within this area including those previously known at Rack Marsh, Kintbury and Denford (see Figure 1). In the current state of knowledge, this represents the greatest concentration of extant sites anywhere in the British Isles. At many of the Kennet and Lambourn sites the density and extent of the *V. moulinsiana* population would rank them as being national strongholds. On this basis they should be considered as being of at least equal in conservation importance to other sites in Norfolk and Sussex for example.

The distribution map in Figure 1 probably shows the limits of *V. moulinsiana* within the Kennet and Lambourn valleys. Within these limits it is likely that it would be found in a continuous line of every area of fen and swamp between Knighton and the western suburbs of Newbury. Much of this land lies within privately owned estates and could not be accessed easily during this survey. Similarly, there are many other suitable places downstream of Newbury which have not

been investigated. *V. moulinsiana* is also known from sites near Pewsey (Wilts) and South Stoke (Oxon) and, therefore, it will probably also be found at other sites on the Rivers Dun, Avon and Thames. Furthermore, there are other similar rivers to the Kennet and Lambourn in Hampshire and Dorset (ie the Test, Itchen, Frome and Hampshire Avon) all of which may provide suitable habitats for *V. moulinsiana*.

The distribution of *V. moulinsiana* within the survey area is restricted by geographical and habitat factors. To the east of Woolhampton, canalisation of the river combined with extensive gravel workings mean that there is little natural, undisturbed fen. The area is also less calcareous. The Kennet valley between Knighton and Marlborough does not have the areas of low-lying fen that are found further east. Most of the *Glyceria* and sedge vegetation is restricted to the river bank where it is disturbed and 'kept tidy' for angling activities. However, further searching may reveal small patches of fen where *V. moulinsiana* is living. Beyond Great Shefford in the Lambourn valley the river becomes quite small and there is less likelihood of suitable habitat.

The absence of *V. moulinsiana* from the Winterbourne Stream is curious as there is so much apparently suitable habitat. Although parts of the valley would be too shaded it is likely that further searching would result in the snail being found in low numbers.

It has not been possible to obtain accurate quantitative data due to the climbing nature of *V. moulinsiana* (ie they are not living in ground litter). The sites where the snails were found were all generally similar. Those with extensive areas of *Glyceria* and sedge in depressions with standing water having the greatest densities of snails, eg Chilton Foliat (Site 4.3.7) or Weston (Site 4.1.4). Those with drier or shaded conditions, or with rank vegetation and scrub encroachment had lower densities or did not support *V. moulinsiana* at all. Its intolerance of high levels of shading may well explain its absence from sites such as Woolhampton and the fen just to the north of Bull's Lock, Thatcham. Although *V. moulinsiana* was found on *Phragmites* plants when they are amongst sedge and *Glyceria*, the snails could not be found at any site where there were dense *Phragmites* beds.

At the sites where enough specimens were examined the structure of the population of *V. moulinsiana* ranged from adults with fully developed lips and apertural teeth to individuals approximately one third grown.

Apart from Thatcham, where sections of Compartment 11 are mown rotationally, there does not appear to be any management at the sites where *V. moulinsiana* was found. It does appear to be reasonably tolerant of traditional cutting. At Market Weston Fen in Suffolk, for example, snails can be found abundantly on the short stems that remain, presumably after having been dislodged and then crawling back up again (pers. obs.).

The assemblage of other molluscs found with *V. moulinsiana* was generally similar at all sites with *Succinea putris, Deroceras laeve* and *Ashfordia granulata* being the most common associates. At the sites where *V. moulinsiana* was abundant, the diversity of other species was generally low whereas at sites where it was rare or absent molluscan diversity increased. This is most likely a reflection of the level of shade. In general, most species of snail prefer damp, shaded conditions whereas *V. moulinsiana* needs a more open environment with the high levels of local humidity provided by the standing water in the fens. Management of sites for *V. moulinsiana* could have some detrimental effect on molluscan diversity. However, most of the associated species are more tolerant and the main effect would be a slight contraction to the shadier areas. Of the other species found, *Vertigo antivertigo* at Great Shefford and *Macrogastra rolphii* at Westbrook were the most noteworthy.

6. Conservation and management

Vertigo moulinsiana may be considered to be a species that is conservation-dependent.

Its survival at any site depends mainly upon preservation of the habitat and in particular prevention of any lowering of the water table.

Most of the sites in the Kennet and Lambourn valleys are afforded some level of protection either from SSSI or informal nature reserve status. Indeed, the entire course of the Lambourn and the Kennet from Marlborough to Woolhampton has recently been designated as SSSI. However, the River Kennet and River Lambourn SSSIs only take in the main rivers, subsidiary channels and marginal vegetation to the tops of the riverbanks. They do not include the flood plain areas. Other SSSIs which were found to support *V. moulinsiana* are Freeman's Marsh and Thatcham Reed Beds.

Within the survey area, the factors most likely to adversely affect the *V. moulinsiana* populations other than hydrological changes are:

- Encroachment by scrub which will result in too much shade and drying out of the habitat. This is a potential problem at some of the Lambourn sites such as Elton Farm and Boxford and especially at Donnington.

- Over grazing. Although several of the meadows visited were wet enough for *V. moulinsiana,* they were so heavily grazed that there was no suitable vegetation for the snail. The effect of grazing was evident at Kintbury where both the vegetation and snails had disappeared from a formerly very good site.

- Excessive tidying and "gardening" of riverbanks for angling activities. Whilst the snails will probably tolerate the marginal vegetation being cut on a rotational (say three- yearly) basis, they are less likely to survive in areas where the sedge is cut every few months or is trampled excessively. Cutting of long, continuous strips of sedge along riverbanks is to be avoided.

- Introduction of cutting programmes at sites where there is no history of this activity.

Sites found to be of particular value are the *Glyceria* swamp at Chilton Foliat, the southwestern end of Thatcham Reed Bed, and Brimpton on the Kennet, and the Lambourn sites at Weston, Hunt's Green, Rack Marsh and Bagnor Bridge. Of these, Thatcham Reed Bed has SSSI status and Rack Marsh is managed as a nature reserve.

It is recommnded that selected sites and populations of *V. moulinsiana* should be monitored for change on say a three-yearly basis. Although the skill would need to be taught, it is a task that could be carried out by English Nature staff or reserve wardens.

7. References

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KERNEY, M.P. & CAMERON, R.A.D. 1979. *A field guide to the land snails of Britain and north-west Europe.* London: Collins.

KILLEEN, I.J. 1992. *The land and fresh water molluscs ofSuffolk.* Ipswich: Suffolk Naturalists' Society.

Addendum by Graham Steven, 31 May 1996

This reports a subsequent visit to additional parts of sites visited previously and to areas not included in the original survey due to time constraints. These visits were undertaken on 8 March 1996 by Ian Killeen, accompanied by Graham Steven, English Nature Conservation Officer. The survey and recording procedure used was as undertaken previously, ie snails were beaten off the vegetation onto polythene sheets and examined and identified in the field.

Site descriptions

Chilton Foliat Meadows SSSI. SU326700

The eastern part of this SSSI was not visited in the original survey. ***V. moulinsiana* was found to be very common** in an extensive area *of Carex acutiformis* growing alongside ditches just to the south of the River Kennet.

Chilton Foliat Meadows SSSI. SU321702

This is a large, currently unmanaged field adjacent to the River Kennet. ***V. moulinsiana* was found to be common** on *Glyceria* and *Carex acutiformis* in damp hollows formerly occupied by ponds and along old drainage ditches.

Chilton Foliat. SU317705

This area south of the B4192 was included in the original survey, but was revisited to confirm that it supported one of the largest populations found in the Kennet and Lambourn valleys. Several specimens of ***V. moulinsiana* were found very quickly.** This area would appear to provide ideal habitat conditions for *V. moulinsiana* with an extensive area of *Glyceria* continuously irrigated with clean water and unshaded by trees.

Eddington Marsh. SU345687

This is a large water meadow by the Kennet to the east of Hungerford with numerous ditches and drains. It also has a clear chalk stream crossing the centre of the field. **Several specimens of *V. moulinsiana* were found** amongst *Carex acutiformis* and scattered reed in a ditch running along the southern edge of the field. Further searching revealed that ***V. moulinsiana* was abundant on** *Carex acutiformis* growing alongside one of the larger drains on the site.

Summary

All of these additional areas surveyed support large populations of *V. moulinsiana* wherever suitable habitat conditions are present. The Chilton Foliat area would appear to hold a large concentration of strong populations. Eddington Marsh is a relatively large site which, although only parts were surveyed, appears to support a very large population widely distributed across the site. Ian Killeen stated that all the additional areas surveyed are at least of equal value to those sites identified in the original survey as being of particular value for *V. moulinsiana*.

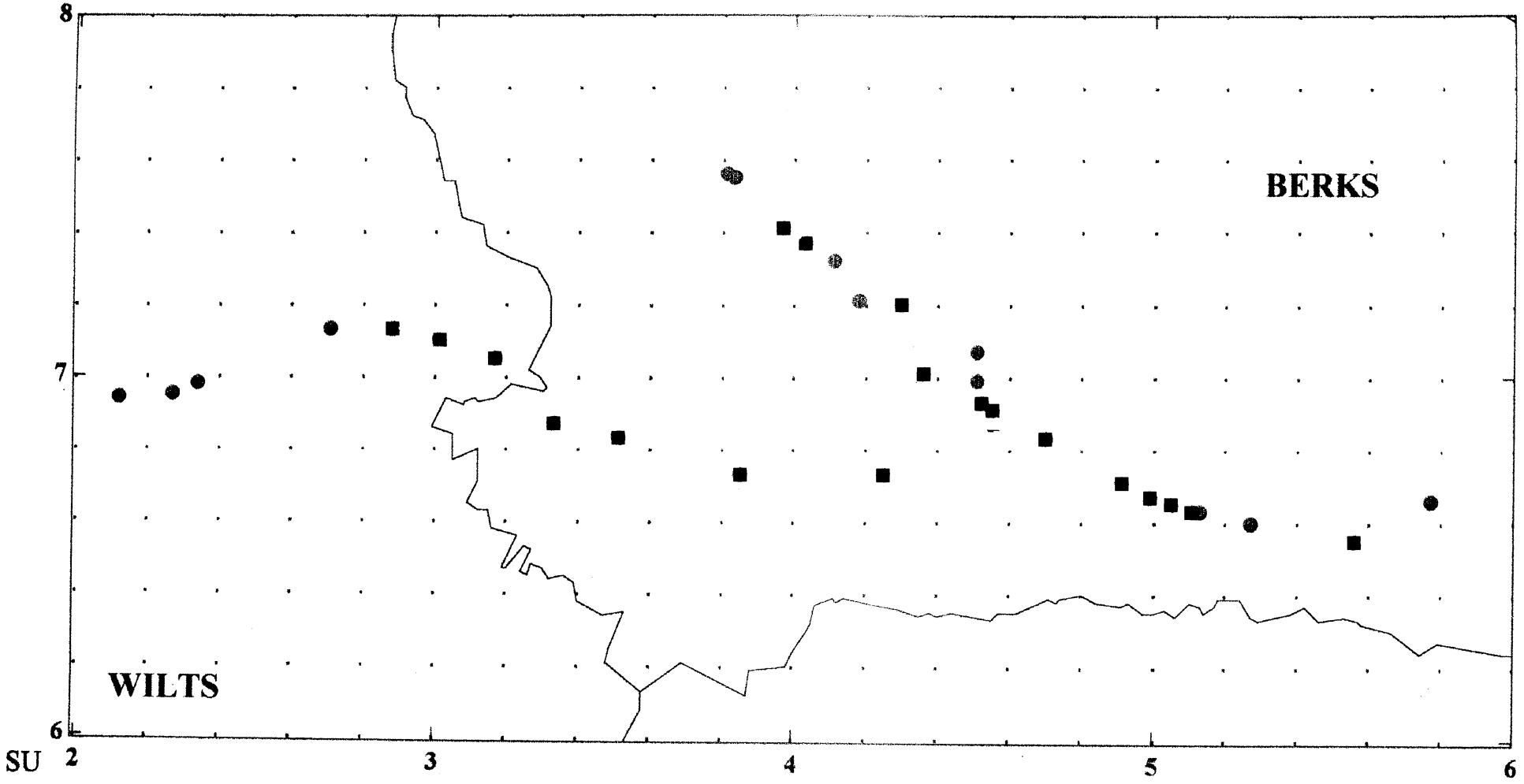


Figure 1: Map showing location of sampling stations.

■ = sites with *Vertigo moulinsiana*

● = negative sites

Figure 2: Site 4.3.7 Chilton Foliat - Extensive *Glyceria* swamp.

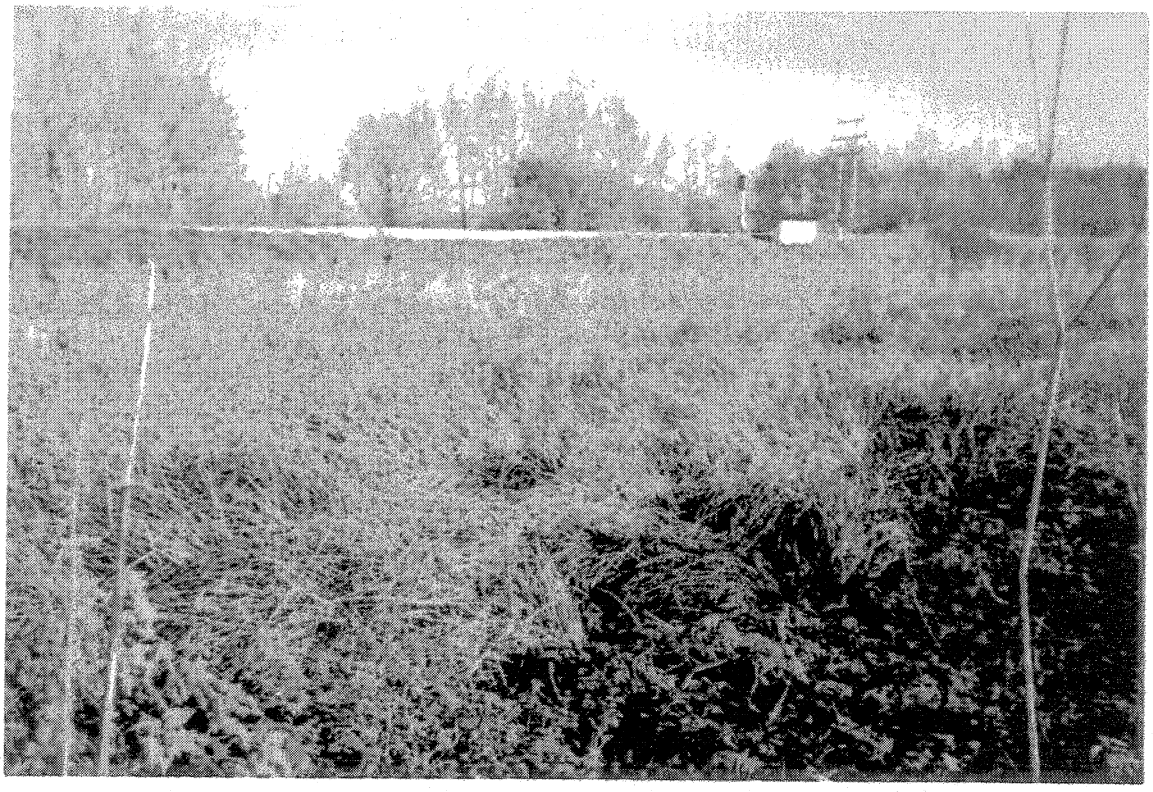


Figure 3: Site 4.3.13 Thatcham - Low-lying sedge fen.

APPENDIX- LIST OF MOLLUSCS FOUND AT EACH SITE

Site numbers as used in Section 4.

Rivers Lambourn and Winterbourne

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	2.1	2.2
Carychium minimum													X
Succinea putris	X	X	X	X	X		X	X	X	X	X	X	X
Columella edentula		X			X			X				X	X
Vertigo antivertigo	X												
V. moulinsiana			X	X			X	X	X	X	X		
Lauria cylindracea											X	X	X
Discus rotundatus											X	X	
Arion ater agg.											X		
A. subfuscus	X						X		X		X	X	
A. intermedius											X		
Oxychilus alliarius												X	X
Zonitoides nitidus												X	
Deroceras laeve	X	X	X	X	X	X	X	X	X		X	X	
D. reticulatum					X	X					X	X	X
Euconulus alderi	X						X					X	X
E. fulvus											X	X	X
Macrogastra rolphii							X						
Monacha cantiana							X				X		
Ashfordia granulata	X			X	X		X	X	X		X	X	X
Trichia striolata					X		X						
T. hispida					X		X						
Arianta arbustorum							X						X
Cepaea hortensis	X		X		X		X				X	X	X

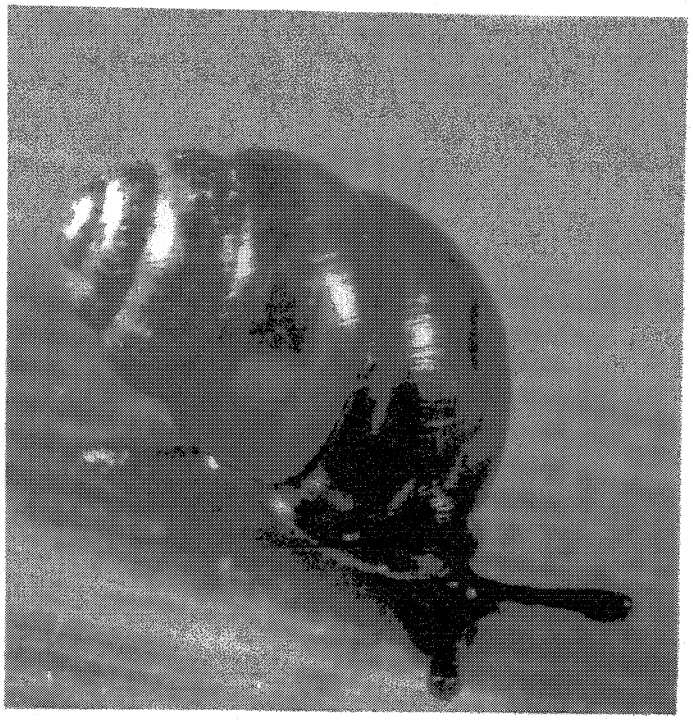
APPENDIX (Continued)
River Kennet

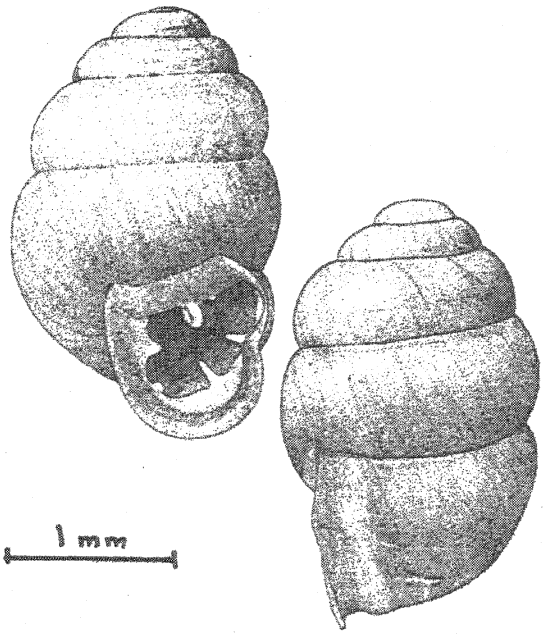
	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.10	3.11
Carychium minimum			X		X			X			
Succinea putris		X	X	X	X	X	X	X	X	X	X
Cochlicopa lubrica					X			X			
Columella edentula			X		X			X		X	
V. moulinsiana					X	X	X	X	X	X	X
Lauria cylindracea								X	X	X	
Punctum pygmaeum					X						
Discus rotundatus			X	X				X			
Arion ater agg.											
A. subfuscus			X			X		X			
Vitrina pellucida								X			
Vitrea crystallina				X				X		X	
Oxychilus alliarius								X			
Zonitoides nitidus				X	X			X			X
Deroceras laeve				X	X	X	X	X	X	X	X
D. reticulatum	X					X		X	X		
Euconulus alderi			X	X	X	X		X	X	X	X
Clausilia bidentata			X			X			X	X	
Ashfordia granulata		X	X	X	X	X	X	X	X	X	X
Trichia striolata			X					X			
T. hispida		X	X		X	X		X			X
Arianta arbustorum								X	X		X
Cepaea hortensis			X			X		X			

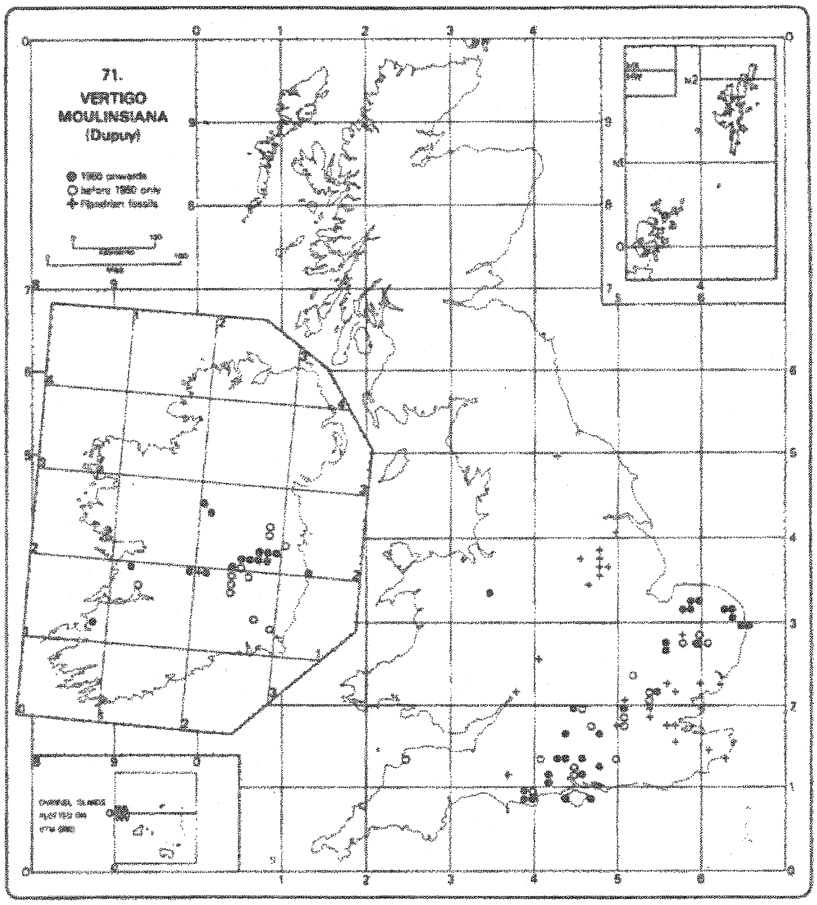
APPENDIX (Continued)
River Kennet

	3.12	3.13	3.14	3.15	3.16	3.17	3.18
Succinea putris	X	X	X		X	X	X
Cochlicopa lubrica					X		X
Columella edentula	X					X	X
V. moulinsiana	X	X	X			X	
Lauria cylindracea					X	X	X
Punctum pygmaeum						X	X
Discus rotundatus					X		X
Arion ater agg.					X	X	X
A. subfuscus						X	X
Oxychilus alliarius			X				X
Zonitoides nitidus			X		X		
Deroceras laeve	X	X	X		X	X	X
D. reticulatum	X				X	X	X
Euconulus alderi	X	X		X		X	X
E. fulvus	X						
Clausilia bidentata						X	X
Monacha cantiana					X		
Ashfordia granulata	X				X	X	X
Trichia striolata					X		X
T. hispida					X	X	X
Arianta arbustorum						X	
Cepaea hortensis					X	X	X

DISTRIBUTION MAP AND ILLUSTRATIONS OF *VERTIGO MOULINSIANA*







Map from Kerney (1976)
Atlas of the non-marine Mollusca of the British Isles

Colour photo from
Killeen (1992)
The Land and Freshwater Molluscs of Suffolk

A survey of the River Avon and tributaries (Wiltshire/Hampshire) and associated wetland habitats to assess their importance for the snail *Vertigo moulinsiana*

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Contents

1. Summary

Seventy six sites or areas were examined on the River Avon and its tributaries above Fordingbridge plus a further site at Moortown, south of Ringwood. An additional four areas along the route of the proposed A36 relief road (Salisbury by-pass) were also surveyed.

Vertigo moulinsiana was located at 29 of these including the previously known site at Jones's Mill, Pewsey. It could not be relocated at Upper Burgate Marsh or at Moortown.

Of the 29 sites, 24 were on the Avon, 3 on the Bourne and single sites on the Till and Wylye. However, several of these sites are not within current or proposed SSSI boundaries. Most of the low-lying areas of fen tend to be located a few metres away from the main rivers. Extension of SSSI boundaries to include these habitats is recommended.

The habitat at the sites in the Avon catchment is quite typical of those found elsewhere in the Hampshire and Thames Basins (permanent wetlands with fen, sedge, *Glyceria* swamp etc). However, many of the the sites at which it was found are very small (tens of square metres).

In terms of national importance the 'meta population' found in the Avon catchment compares favourably with that living in the Kennet and Lambourn valleys. The habitat is perhaps more fragmented and less extensive than in the Kennet/Lambourn. The Avon 'meta population' merits special consideration on the basis that it lies within the Hampshire Basin rather than the Thames and may, therefore, be genetically different. Also it lies within an area which is much more intensively farmed and is thus under greater threat.

The results of this survey indicate that no populations of *V. moulinsiana* would be directly affected by the route of the proposed Salisbury by-pass. Although the snail could not be found at any sites the possibility that small or low density populations exist along the proposed route cannot be eliminated.

2. Background and objectives

V. moulinsiana is listed in the British Red Data Book (Bratton, 1991) as an RDB3 (Rare) species, and is scheduled on Annex II of the European Habitats & Species Directive. There is considerable evidence that this species is declining throughout its range (Killeen, 1995). The greatest threats are from changes to local hydrology; drainage of fens and marshes; shading of habitat by scrub encroachment; change of land use and development. There is also evidence that its decline, particularly in Britain, may in part be due to gradual cooling since the climatic optimum (Bratton, 1991).

Vertigo moulinsiana is an inhabitant of mainly calcareous fens. It occurs in long-established swamps, fens and marshes usually bordering rivers and lakes. It lives on both living and dead stems and leaves of tall plants: grasses (eg *Glyceria maxima*), sedges (eg *Carex riparia* and *Cladium mariscus*), and reeds (eg *Phragmites australis*) (Kerney & Cameron 1979, Bratton 1991, Killeen 1992). The species shows a preference for life on taller vegetation upon which it climbs during the season and is rarely found in litter.

It is a European, probably Holarctic species. Although it ranges from Ireland to Russia and south to North Africa, the main populations are in western and central Europe. In Britain *V. moulinsiana* is locally distributed across southern and eastern England from Dorset to north Norfolk with a few isolated colonies elsewhere. The geographical distribution is essentially as given by Kerney (1976), Bratton (1991) etc. However, a surge of interest in the species in recent years has revealed previously unknown colonies in Hampshire, Berkshire, Wiltshire and Oxfordshire. In 1995 English Nature funded a survey to assess the Kennet and Lambourn valleys

for their importance for this species. The results of this work (Killeen, 1996a) supplemented with data from the route of the Newbury by-pass (Killeen, 1996b) showed that the Kennet/Lambourn system was a national stronghold and that within its known area of distribution, the abundance of *V. moulinsiana* had been seriously underestimated.

As a further conclusion from the Berkshire work it was suspected that the River Avon and its tributaries might provide enough of the required habitat and that *V. moulinsiana* might prove to be similarly common and widespread. Previous records for the catchment are few: Jones's Mill, Pewsey (1993); Fisherton de la Mere, R. Wylye (1944); Upper Burgate, Fordingbridge and Moortown (all 1970).

This contract was issued in two parts by English Nature with the following objectives:

Phase 1

To survey a selection of sites in the Avon catchment to determine whether *Vertigo moulinsiana* is present, make a broad estimate of population size within each site, and to assess the importance of the sites in relation to other known centres of abundance. The following approximate areas were selected for survey:

R. Avon: Vale of Pewsey (east and west of Pewsey) to include headwaters; north and south of Salisbury from Upavon to north of Fordingbridge; East Harnham Meadows; known sites at Upper Burgate and Moortown (south of Ringwood).

R. Bourne: downstream of Winterbourne Dauntsey.

R. Nadder: east of Dinton

R. Till: from source

R. Wylye: downstream of Fisherton de la Mere

R. Ebble: downstream of Stratford Tony

Phase 2

Based upon information gathered in Phase 1, carry out a more detailed survey of the sites where *V. moulinsiana* was found to be frequent and to survey additional sites that appeared suitable. Provide detailed 1:10,000 maps showing extent of populations to enable site boundaries to be defined.

Survey additional wetland sites with a high botanical interest which may prove to be suitable. Sites nominated by English Nature, Devizes office.

Carry out survey of selected areas of wetlands south and west of Salisbury that are on the route of the proposed A36 Relief Road (Salisbury By-pass) to determine if any populations of *V. moulinsiana* are likely to be affected

3. Sampling and recording procedure

Based on personal experience with *Vertigo moulinsiana* particularly in Berkshire but also elsewhere in the country, the sampling strategy was designed to yield the maximum data on this species within the time available. Searching for the snail was confined to low-lying wetlands, ideally with a flora dominated by sedge and *Glyceria*.

In Phase 1 of this survey some sites were specified by English Nature, Peterborough, others were suggested by English Nature Wiltshire and Hampshire offices. Other suitable sites were sought from scrutiny of 1:25,000 and 1:10,000 OS maps and Phase 1 Habitat surveys. However, most of the initial site selection was based on opportunism and visual observation whilst driving around.

Experience in Berkshire had revealed that close examination of the stems and leaves of sedges and *Glyceria* in the field was both time consuming and not always reliable at sites where *V. moulinsiana* was living at low density. To maximise productivity on this survey the snails were sought using only a beating technique: A large sheet of heavy duty, blue polythene was spread on the ground at the base of the vegetation. The leaves were then bent over the sheet and vigourously shaken to release all the adhering snails. At sites where *V. moulinsiana* could not be spotted in the field, the debris was taken away and examined microscopically.

The locations of all the sampling stations (except sites affected by the proposed By-pass) are marked on the map in Figure 1. Detailed maps showing the extent of each population form an Appendix to this report. Brief descriptions of each site are given in Section 4.

All of the survey work for Phase 1 was carried out over 6 days between 18 and 24 March 1996. Phase 2 was carried out between 21 and 25 May 1996.

4. descriptions of sites and sampling stations

4.1 Phase 1 & 2 snail/potential sites and nominated botanical sites

Sites marked with an asterisk were nominated as sites as being of high botanical interest although some had already been visited during Phase 1.

4.1.1 River Avon & feeder streams upstream of Upavon

UA1 SU06-60-

Etchilhampton Water. Stream with small patches of *Phalaris* along banks and ditches with sparse *Phragmites*.

UA2 SU07-58-

Patney. Steep sided stream with sparse *Phalaris*. Ditch running alongside road and arable field (recently manured) with large *Carex acutiformis* plants plus some *Glyceria* and *Phalaris*.

UA3 SU088580

Marden. Meadow with wet depressions vegetated by *Phalaris* and sedge. Stands of sedge along stream bank.

UA4 SU088582

Marden. Wet meadoww between woodland and river. Depressions with sedge and *Glyceria* but herb cover suggests that site is too dry in summer.

UA5 SU08-59-

Beechingstoke. Sttream running through agricultural land. Occasional patches of low-lying *Glyceria* north of railway. Meadow reverting to marsh with tall herbs, *Phalaris* and some sdege at 085593.

UA6 SU105571

Wilsford. Meadow north of stream. Diverse vegetation dominated by *Phalaris*, some herbs and clumps of sedge. Rather dry.

UA7 SU129559

Rushall. Stream running through agroicultural fields with occasional sedge where bank is shallower.

UA8 SU10-60-

Alton Branes. Small stream fringed by trees through improved grassland.

*UA9 SU11-59-

Bottlesford. South of road: *Phragmites* bed adjacent to alder wood. Between road and railwayline, west of stream: meadow grazed by horses, very wet with areas of dense *Carex acutiformis* and *Phalaris*. *Phragmites* dispersed throughout.

UA10 SU13-57-

North Newnton. Complex of ditches and channels alongside river north of trout lake. Fringed by woodland with patches of sedge. ***Vertigo moulinsiana* found commonly in two small side channels with dense *Carex* swamp on west side of side stream.** The snail was also found sporadically in fringes of sedge along the streams to the north of the church..

UA11 SU16-61-

Jones's Mill Reserve (SSSI). Complex of spring fed water meadows with network of ditches fringed by dense sedge, *Glyceria* etc. Depressions with swamp vegetation. ***Vertigo moulinsiana* very common and widely dispersed in open areas.**

UA12 SU143604

S of Wilcot. Stream fringed by mainly *Juncus* running through rough pasture.

UA13 SU155593

East of Pewsey Sewage Works. Extensive area of mainly *Phragmites* along north bank of river with seversal depressions and trickles with swamp vegetation (*Glyceria* and sedge). Smaller swampy areas also along south bank in shade. ***Vertigo moulinsiana* common in the wetter depressions from the sewage works to the road at Sharcott village.**

UA14 SU148590

West Sharcott. Extensive *Phragmites* beds on both sides of the river and side channels. Many lower lying areas with depressions with sedge and *Glyceria*. ***Vertigo moulinsiana*** **very common in the more open areas.** An extensive 'island' of suitable looking habitat continues to the west (SU14855895) but was not investigated.

UA15 SU139587 & 136585

Manningford Bruce. Swampy alder woodland with tussock sedge and *Glyceria* in the open areas. ***Vertigo moulinsiana*** **sparsely distributed.**

4.12 River Avon between Upavon and Salisbury

RS1 SU134545

South of Upavon. Meadow to west of river with *Phalaris, Juncus* and *Dipsacus fullonum*. *Glyceria* swamp in ditches. ***Vertigo moulinsiana*** **sparse.**

RS2 SU142515

Enford. *Glyceria* and sedge swamp along west bank of river, north and south of bridge. Also adjoining ditches.

RS3 SU147504

Coombe. Large wet meadow on east side of river dominated by *Glyceria, Phalaris* and tall herbs. ***Vertigo moulinsiana*** **frequent in the wetter areas.**

RS4 SU147492

Haxton. Patches of *Glyceria* swamp with some sedges at several places above and below the road bridge. ***Vertigo moulinsiana*** **sparsely distributed throughout.**

RS5 SU150486

Netheravon. Wet meadow on west bank of river, north of bridge. Dominated by *Phalaris* but wetter depressions and ditches with abundant *Carex acutiformis*. ***Vertigo moulinsiana*** **very common in wet areas.**

*RS6 SU155479

Choulston. Mixed fen adjacent to river bank by bridge. Areas of standing water with *Glyceria* and sedge. ***Vertigo moulinsiana*** **frequent.** It could not be found in the narrow fringe of *Glyceria* on the river banks or in the grazed meadows on north bank of river.

RS7 SU153469

Figheldean. Woodland along east bank of river with open areas of swamp woth *Glyceria*, sedges, *Phalaris* and *Phragmites*. ***Vertigo moulinsiana*** **frequent throughout and locally abundant.** There were also extensive areas of mainly *Phragmites* marsh with some sedge along both river banks south of road **with** ***Vertigo moulinsiana*** **occurring more sparsely.**

RS8 SU166450

Milston. Band of sedge swamp along shallow river banks. ***Vertigo moulinsiana*** **frequent.**

RS9 SU165438

Bulford. Well maintained grassy banks with little marsh amongst improved grassland.

*RS10 SU157408

Amesbury. Large area of low-lying wetland and adjoining ditches with sedge, *Glyceria* swamp, *Phalaris* etc. ***Vertigo moulinsiana*** **common in the wetter areas.**

*RS11 SU143413 to 142400

West Amesbury to Normanton. Fringes of sedge and *Glyceria* along riverbanks (cut in many places for anglers). Complex of ditches in grazed meadows and along woodland margins (unaffected by grazing) many with luxuriant patches of sedge swamp. ***Vertigo moulinsiana*** **locally common, particularly in the ungrazed areas.**

RS12 SU129373

Upper Woodford. Dense patches of *Carex* spp. and some *Typha* along river banks mostly on south side. Much disturbance due to angling activities. ***Vertigo moulinsiana*** **frequent.**

RS13 SU129363

Netton. Small area of sedge swamp in corner of field. ***Vertigo moulinsiana*** **abundant.**

RS14a SU125358

Lower Woodford (Part of Lower Woodford Water Meadows SSSI). Island with patches grassland, woodland, and wet depressions with *Glyceria* and sedge. Dense fringe of sedge along river bank in places. ***Vertigo moulinsiana*** **sparsely distributed.**

RS14b SU122356

Middle Woodford. Small patches of disturbed roadside fen.

RS14c SU126353

Lower Woodford. Small patches of *Phalaris* and *Glyceria* along river banks.

RS15 SU146488

Fittleton. Fringes of sedge and *Glyceria* along river banks. **Occasional *V. moulinsiana*.**

RS16 SU157465

South of Figheldean. Riverside fringe of mainly *Glyceria*. ***V. moulinsiana*** **rare.**

RS17 SU159459

Brigmerston. Wide fringe of fen/woodland **with occasional *V. moulinsiana*.**

RS18 SU133379

Great Durnford. Fens on 'islands' between river and mill streams. ***V. moulinsiana* very common in places.**

*RS19 SU127324

Stratford sub Castle. River and millstream with dense fringes of sedge. ***V. moulinsiana* occasional.** Many ditches with *Glyceria* but all were heavily grazed.

4.13 River Bourne between Gomeldon and Salisbury

This stretch of river presented many difficulties with gaining access. The sites investigated were mostly adjacent to public footpaths and, therefore, the survey for the Bourne was less comprehensive.

RB1 SU183359

West Gomeldon (Porton Meadows SSSI). Low-lying meadows with swampy vegetation (mainly *Carex*) in depressions and along river margins. ***Vertigo moulinsiana* common.** Suitable looking habitat occurs over a significant part of the SSI but was not investigated.

RB2 SU180353

Winterbourne Gunner. Swamp with *Carex acutiformis* and *Glyceria* along east bank of river, north of bridge. ***Vertigo moulinsiana* common.**

RB3 SU173350

Winterbourne Dauntsey. Stream adjacent to the Bourne with mainly *Carex*.

RB4 SU168338 to 173343.

Hurdcott to Winterbourne Earl. Extensive areas of wet woodland with fen and open fen with *Phalaris*, sedge, tall herbs, and *Glyceria* in depressions. ***Vertigo moulinsiana* sparsely distributed in areas of accessible fen.** Most of the area looks potentially suitable for *V. moulinsiana*.

RB5 SU16-32-

Ford. River banks with marginal *Phalaris* and occasional *Glyceria* in depressions. Mostly too high and dry.

RB6 SU156183

Laverstock. River and ditch margins with dense *Carex acutiformis*.

4.14 River Till

T1 SU076406

Winterbourne Stoke Church. Grassland with little marginal vegetation.

T2 SU073396

Berwick St James. Area of dense *Carex acutiformis* along ditch and extending east to the river bank and south into the marginal alder woodland. ***Vertigo moulinsiana*** **sparsely distributed.**

T3 SU072390

Berwick St James. Ditch with mainly *Phalaris* and some *Glyceria*. Probably too dry in summer.

T4 SU06-37-

Stapleford. Improved grassland with sparse *Phalaris* along river margins.

4.15 River Wylye downstream of Fisherton de la Mere

W1 SU001385

Fisherton de la Mere. Improved grassland with patchy froinge of trees and *Phalaris* along river banks.

W2 SU036372

Steeple Langford. Rough pastureland wuth drainage ditches. Occasional areas with *Phalaris* and tall herbs.

W3 SU045372 to 066369

Steeple Langford to Stapleford. Improved grassland with patchy fringe of trees and *Phalaris* along river margins.

W4 SU072360 to 075359

Little Wishford. Dense fringe of *Carex acutiformis* and *C. riparia* along north bank of channel. Backed by extensive area of *Phragmites* and *Phalaris* with sedge in depressions. This is probably a remnant of a formerly more extensive area of fen. ***Vertigo moulinsiana*** **common on the sedge along the river banks and in the depressions.** South of river is improved grassland which extends down to the water's edge.

W5 SU083355 to 093330

Great Wishford to Chilhampton. Improved grassland with patchy fringe of trees and *Phalaris* along river banks.

4.16 River Nadder downstream of Dinton

N1 SU008307

Dinton. Improved grassland with patchy fringe of trees and *Phalaris* along river margins.

N2 SU03-30-

Baverstock. Improved grassland with patchy fringe of trees and *Phalaris* along river margins.

N3 SU060312 to 079311

Barford St Martin to Ugford. Improved grassland with patchy fringe of trees and *Phalaris* along river margins. Patch of meadow to the east of Burcombe with more abundant Phalaris and tall herbs.

N4 SU120305

Bemerton. Fringe of sedges and flood debris on river bank, heavily shade by trees.

N5 SU138298

Salisbury. River and culvert with dense patches of sedge.

*N6 SU138296

Cathedral Meadows, Salisbury. Extensive area of grassland with shallow ditches and depressions. Too grazed for *V. moulinsiana*.

*N7 SU112309 to 121303

Boys Meadow Withy Bed and Bull Plot Withy Bed. Areas of old, wet woodland with fen in more open places. There is a more extensive area of sedge and *Glyceria* beneath the pylons at the western end of Boys Meadow but there is little standing water in the depressions.

4.17 River Ebble downstream of Stratford Tony

E1 SU095265

Stratford Tony, stretch for 0.7km downstream of church. Mainly alder woodland along south bank. Rough pasture and ploughed fields along north bank with occasional patches of *Phalaris* on river bank.

E2 SU12-26-

Homington. Meadows and rough pasture with complex of drainage ditches. Mainly vegetated by *Juncus* spp. and heavily grazed. Some places near roadside and field margins with patches of sedge and *Glyceria*.

E3 SU14-26-

Odstock. Meadows and rough pasture with complex of drainage ditches. Mainly vegetated by *Juncus* spp. and heavily grazed.

E4 SU163265

Nunton. River banks with stands of sedge.

4.18 River Avon below Salisbury

BS1 SU153287

East Harnham Meadows SSSI. Grazed water meadows. Ditches and depressions often with lush stands of sedge, *Glyceria* and *Phalaris*. Most of the ditches were affected by grazing and, therefore, few had a dense fringe of vegetation. See also Section 4.2 Road sites.

BS2 SU168281

Britford. Complex of water meadows with ditches. Mostly heavily grazed but some ditches with denser sedge and *Phalaris*.

BS3 SU169254

Bodenham. Ungrazed meadow with sedge, *Phalaris* and tall herbs. Some wet areas alongside ditches but probably too dry in summer.

BS4 SU171250

Bodenham (Matrimony Farm). Ungrazed meadows with ditches and depressions, some with dense areas of sedge.

BS5 SU180237

Charlton. Old water meadows with ditches, scrapes (?decoys) and depressions. Abundant sedge in places. The area has recently been receiving some form of management.

BS6 SU177184

Woodgreen. Roadside ditch with luxuriant stands of sedge (and ? *Sparganium*).

BS7 SU163175

Breamore. Complex of rivers, streams and ditches. Meadows with wet depressions and ditches with sedge but most is heavily grazed.

BS8 SU155163

Upper Burgate. Extensive wetland on north side of river dominated by *Phalaris*, *Phragmites* and tall herbs. Depressions with sedge and some *Glyceria* but none have standing water. This habitat seems to be drying out, due possibly to deepening of drainage ditches.

BS9 SU126167

Sales Springs. Small fen along springline with tussocks of *Carex paniculata, Juncus* etc. Sedge also along stream bank and in depressions in meadow but all is heavily grazed.

BS10. SU150040

Moortown, S of Ringwood. Extensive complex of wet meadows, ditches, ponds, alder woodland, swamp etc.

*BS11 SU152290 to 169282

Whittle Estate. Grazed water meadows. Ditches and depressions often with lush stands of sedge, *Glyceria* and *Phalaris*. Most of the ditches and river banks were affected by grazing or were cut for angling interests and, therefore, few had a dense fringe of vegetation. See also Section 4.2 Road sites.

4.2 Sites along the route of the proposed A36 relief road (Salisbury by-pass)

a. SU063368 to 068365

Serrington, south of the river. At western end there is a tree lined ditch with a pond surrounded by *Typha* at its southern end. The small network of ditches runs southeastwards to the R. Avon through a cereal field and then through grazed meadows. These were ploughed up in the 1970s and reseeded (local farmer pers. comm.). Most of the ditches are shaded by hawthorn and only have fringes of *Phalaris* or occasional *Phragmites* in the open areas. All are grazed. There was liitle suitable habitat along the river banks as they are well maintained for angler's interests.

b. SU128297 to 123292

West of Harnham, route of proposed Brunel link road. Patches of wet woodland and fen alongside river and streams at northeast end. The rest of the route goes through fields and meadows. The ditches are shallow with occasional wetland vegetation, most of which is grazed.

c. SU116305 to 121293

Northeast of Netherhampton. The proposed route passes through grazing meadows and fields. It traverses several ditches, most of which are shallow and/or poorly vegetated.

d. SU154286 to 163290.

Britford to Petersfinger. On the south bank of the R. Avon, the route crosses the southern end of East Harnham Meadows (Site BS1) and the middle of the Whittle Estate (Site BS11). There are richly vegetated ditches in these areas, however, all are grazed and *V. moulinsiana* could not be found. On the north bank of the river just to the west and north of the sewage works there are also a number of ditches which would be affected by the proposed road. Most of these are in meadows or fields that are again subject to grazing. Just off route to the west at SU157289 there is an extensive area of ungrazed fen with sedges and *Glyceria*. Despite its apparent suitability, *V. moulinsiana* could not be found.

5. Results and discussion

Seventy six sites were examined (excluding by-pass areas) on the River Avon and its tributaries above Fordingbridge plus a further site at Moortown, south of Ringwood. The results of this work have shown that *Vertigo moulinsiana* is living at 29 of these including the previously known site at Jones's Mill, Pewsey. Of the 29 sites, 24 were on the Avon, 3 on the Bourne and single sites on the Till and Wylye. In terms of national importance for *V. moulinsiana* the Avon catchment compares favourably with the Kennet and Lambourn valleys in Berkshire.

It has not been possible to obtain accurate quantitative results due to the climbing nature of *V. moulinsiana* (ie they are not living in ground litter). To give some quantitative element to the data an abundance (ACFOR) scale was used. Generally the species was regarded as abundant if more than 15 specimens were found in each 'beating', whereas it was considered rare if only one specimen was found in 5 beatings. It is noteworthy that the snails were more difficult to find during Phase 2 than they were 2 months earlier in Phase 1. This is presumably a result of the snails becoming dispersed between a greater quantity of (newly emerged) vegetation.

The distribution map (Figure 1) shows both the positive and negative sites within the survey area. On the Avon *V. moulinsiana* was found at virtually every site examined between Pewsey and Lower Woodford. It is very likely that *V. moulinsiana* is living in every suitable area of habitat along this stretch of the Avon. A similar picture exists on the Bourne north of Ford. The fen at Berwick St James appears to be the only area with this type of habitat on the River Till. The Wylye site at Little Wishford is of particular interest as all of the valley within the survey area is intensively farmed with lush, improved grassland extending down to the water's edge at most places.

The habitat at the sites in the Avon catchment is quite typical of those found elsewhere in the Hampshire and Thames Basins (permanent wetlands with fen, sedge, *Glyceria* swamp etc). However, many of the the sites at which it was found are very small (tens of square metres). The landscape in the Avon catchment is rather different from that in the Kennet/Lambourn, being much more intensively farmed. Arable cultivation and in particular improvement of the grassland are features of this area. As such the areas of suitable *V. moulinsiana* habitat are often smaller and more fragmented.

The reasons for its apparent absence around, and south of Salisbury are unclear. On the Ebble and upper Nadder it is probably due to lack of suitable habitat. However, on the lower Nadder and Avon there is an abundance of seemingly suitable sites yet *V. moulinsiana* could not be found. It is either living in very low density or is genuinely absent. Management as water meadows (and therefore ephemeral conditions), water abstraction, deepening of channels are all factors that may result in hydrological conditions that were too unstable for the snail. Furthermore, most of the meadows are subject to regular grazing and, therefore, the habitats are also too unstable. There are also a number of industrial areas to the west of Salisbury. It is possible that input of chemicals from these and also agricultural run off may also be contributory factors.

The failure to relocate it at Upper Burgate Marsh may be due to a drying out of the habitat. Whilst there were still a few depressions with sedge, none had any standing water and most had emergent nettles and willowherb. The site at Moortown is very extensive and more work would be required to determine whether *V. moulinsiana* survives.

Of the sites of high botanical interest at which *V. moulinsiana* was not found the absence may be explained by lack of suitable habitat or over-grazing. However, the site at Bottlesford would appear to have all of the necesssary hydrological and vegetative conditions. Although the area was searched extensively it is possible that the snail is living at low density or in isolated pockets.

It is thought unlikely that the trampling and grazing by a few horses would be a cause for the absence. The western end of Boys Meadow Withy Bed also appeared suitable in terms of vegetation although it was much drier than most of the other positive sites.

As it was not within the specification of this project to carry out a full molluscan survey the lists of associated species recorded at each site have not been included in this report. The assemblage of other molluscs found with *V. moulinsiana* was generally similar at all sites with *Succinea putris, Deroceras laeve* and *Ashfordia granulata* being the most common associates. At the sites where *V. moulinsiana* was abundant the diversity of other species was generally low whereas at sites where it was rare or absent molluscan diversity increased. Of the other species found *Vertigo antivertigo* at North Newnton was the most noteworthy.

6. Impact of the proposed salisbury by-pass

Vertigo moulinsiana could not be located at any of the sites along the route of the proposed Salisbury By-pass. Based upon the results from all of the other sites examined during this survey, it would appear that this absence is most likely due to lack of suitable habitat. There are no areas of natural, ungrazed or undisturbed fen such that it is found at all or most of the positive sites. On the basis of these results it would appear that the snail is not a subject for mitigation on this road project. However, the possibility that *V. moulinsiana* is either living at very low density or in small, isolated colonies along some part of the proposed route cannot be eliminated.

7. Conservation and management

Vertigo moulinsiana may be considered to be a species that is dependent upon conservation and preservation of habitat and is especially vulnerable to a lowering of the water table.

Its survival at any site depends mainly upon preservation of the habitat and in particular prevention of any lowering of the water table. There are a number of general factors which could be applied to most sites in the Avon catchment that would adversely affect the *V. moulinsiana* populations:

- Changes in hydrology such as water abstraction from the rivers, deepening of drainage channels, drainage of wetlands generally.
- Changes in land use e.g. from rough pasture or meadow to improved grassland.
- Encroachment by scrub which will result in too much shade and drying out of the habitat.
- Over grazing. Although several of the meadows and ditches visited were wet enough for *V. moulinsiana* they were so heavily grazed that there was no suitable vegetation for the snail.
- Excessive tidying and gardening of riverbanks for angling activities. Whilst the snails will probably tolerate the marginal vegetation being cut on a rotational (say 3 yearly) basis, they are less likely to survive in areas where the sedge is cut every few months or is trampled excessively. Cutting of long, continuous strips of sedge along riverbanks is to be avoided.
- Introduction of cutting programmes at sites where there is no history of this activity.

Within the area *V. moulinsiana* occupies much of the suitable habitat and is probably in a state of dynamic equilibrium. It seems likely that the snail will disappear from habitats as they become

unsuitable and colonise others as conditions become more favourable. However, sympathetic conservation is required to maintain the status quo. It is recommended that selected sites and populations of *V. moulinsiana* within the Avon catchment should be monitored for change on say a three-yearly basis.

Grazing would appear to be a significant factor in restricting *V. moulinsiana* populations. There are potential areas in the Avon valley where more suitable habitat could be created by erecting barbed wire fences around the ditches and swampy areas to prevent cattle from grazing the emergent vegetation. A sufficient gap would need to be left to give a wide enough exclusion zone. The stretch between Normanton and West Amesbury offers opportunities for such a scheme.

Most of the sites in the Avon catchment are in wetlands adjacent to the river and are, therefore, not within the existing or draft SSSI boundaries. These usually only take in the main rivers, subsidiary channels and marginal vegetation to the tops of the riverbanks and do not include the flood plain areas. Of the Avon sites where *V. moulinsiana* was found the following are existing SSSI boundaries: Jones's Mill (UA11), Lower Woodford (RS14). On the Bourne, site RB1 is within Porton Meadows SSSI.

It is recommended that the boundary of the proposed Avon SSSI should be extended to include the adjacent wetlands at the sites at which *V. moulinsiana* was found i.e the stretch from Pewsey to West Sharcott and from say Coombe to Lower Woodford. The Till, Wylye and Bourne are also currently under review for SSSI status. Therefore, it is similarly recommended that the sites at Berwick St James (Till T2), Little Wishford (Wylye W4) and between Winterbourne Gunner and Hurdcott on the Bourne are all included within the proposed boundaries. A further survey of the Bourne would be recommended once full ownership details have been established.

In terms of national importance the 'meta population' found in the Avon catchment compares favourably with that living in the Kennet and Lambourn valleys. However, the Avon 'meta population' merits special consideration on the basis that it lies within the Hampshire Basin rather than the Thames and may, therefore, be genetically different. Also it lies within an area which is much more intensively farmed and is thus under greater threat.

Some further survey work would be desirable both in the Avon catchment and other areas:

- Examine the Wylye west of Fisherton de la Mere.
- etailed examination of the Bourne upstream of Hurdcott.
- urther survey of the Avon south of Fordingbridge.
- e-evaluation of the Dorset sites.

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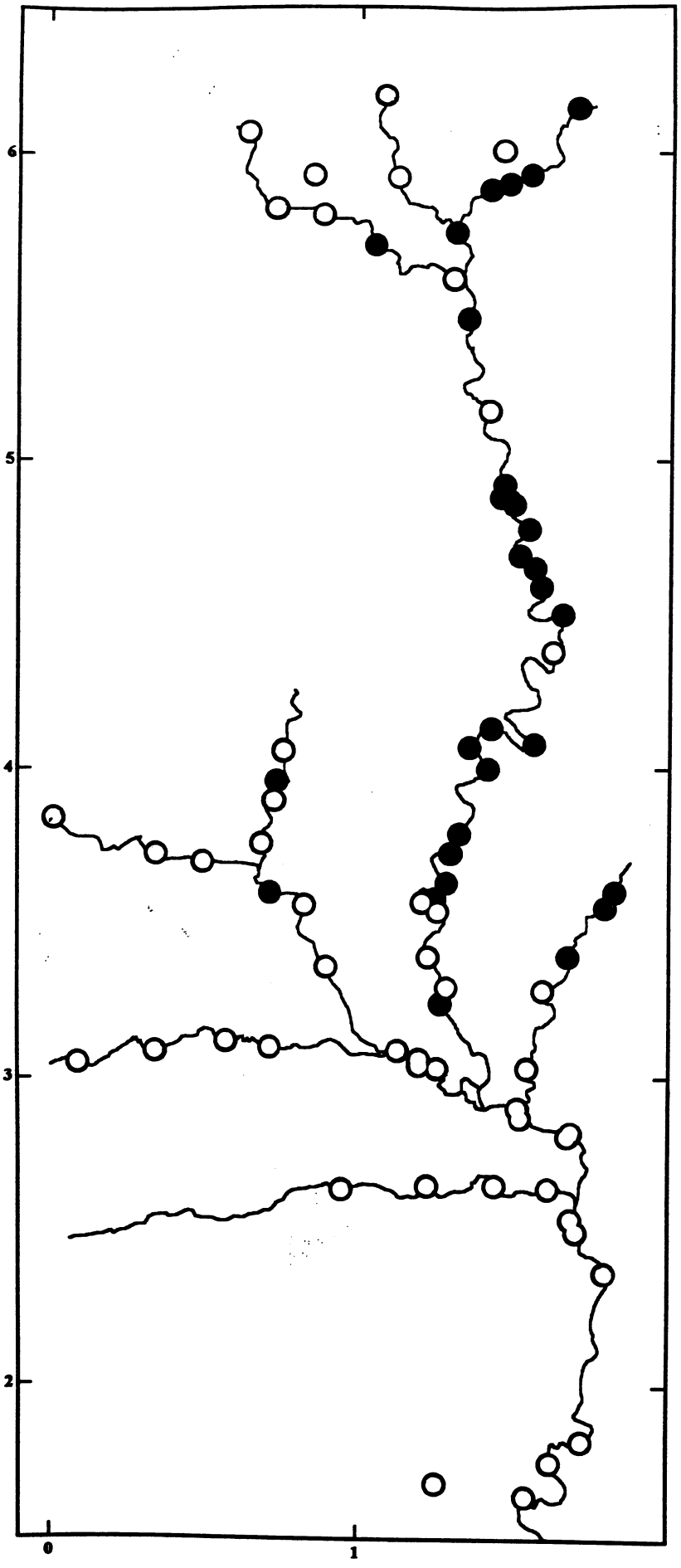

Figure 1: Map showing location of sampling stations in the Avon catchment area.

● = sites with *Vertigo moulinsiana*

○ = negative sites

Further survey of the River Avon and tributaries (Wiltshire) and associated wetland habitats to assess their importance for the snail *Vertigo moulinsiana*

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Summary

Three categories of site were surveyed:

- sites where *Vertigo moulinsiana* was thought to be frequent from Pewsey to Lower Woodford on the Avon, on the Wylye at Little Wishford and sites on the Till and Bourne;
- wetland sites of high botanical interest;
- sites south and west of Salisbury in the area of the proposed A36 relief road (Salisbury by-pass).

Results

English Nature, Devizes, was provided with a series of maps showing the areas where *V. moulinsiana* was found and the extent of populations. The majority of sites had been previously examined from footpaths to determine the presence of the snail. This survey has added further distributional data both within sites and at further localities. The maps are annotated with comments concerning habitat and suggested positions regarding SSSI and possible SAC boundaries. It is recommended that most of the populations are included within the SSSI and that the following are considered for inclusion within a potential SAC for *Vertigo moulinsiana*:

- sites above Upavon: Jones's Mill Trust Reserve, Pewsey; W of Pewsey sewage works; West Sharcott;
- sites between Coombe and Amesbury: Coombe; Netheravon; Figheldean;
- sites between Amesbury and Salisbury: Amesbury; West Amesbury to Normanton; Great Dumford; Upper Woodford; Lower Woodford;
- sites on the Till at Berwick St James;
- sites on the Wylye at Little Wishford;
- sites on the Boume between Porton and Hurdcott;

These sites cover all of the substantial populations of *V. moulinsiana* and represent the range of habitats in which this meta-population is found within the Avon catchment. It is considered important that the Wylye and Bourne sites in particular are included within the SAC.

Botanical sites

Of the sites suggested by English Nature, some had already been partially covered within the first category of sites. *V moulinsiana* was found at Amesbury, West Amesbury, and Choulston. It was also found sparingly on riverside sedge at Parsonage Earn LNR at Stratford-sub-Castle. Woodborough/Bottleford was examined during the first survey and although the area of wet sedge fen appeared to be ideal, *V. moulinsiana* could not be located. The possibility of it living at low density cannot be eliminated though. It was not found at East Harnham Meadows, Cathedral Meadows or other Nadder sites (Boys Meadow and Bull Plot Withy Beds).

Sites on the route of the proposed A36 relief road

The areas examined along the proposed route are hatched in green on the maps in Figures 12, 14 & 15. *V. moulinsiana* could not be located at any of these sites during either survey. The absence of *V. moulinsiana* at sites south of Salisbury accords with the results from the first survey. On this basis it would appear that the snail is not a mitigating issue in the road enquiry. However, the possibility that the snail is either living at very low density or is surviving in fragments of habitat cannot be ruled out.

Note: Maps are not included in this report but are held by English Nature, Devizes.

A survey to determine boundaries of pSSSI for *Vertigo moulinsiana* on the River Bourne, Wiltshire

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1. Introduction

Surveys carried out by Malacological Services on behalf of English Nature in Spring 1996 had identified that significant populations of the terrestrial snail *Vertigo moulinsiana* were living along the River Bourne upstream of Hurdcott. On the basis of these results it was recommended that the Bourne should be included in the Avon pSSSI. However, due to difficulties with identifying and contacting local land owners, and thus not being able to gain access to all of the potential snail habitat, it was not possible to accurately define boundaries.

This contract was issued by English Nature with the specific aim of determining the pSSSI boundaries by carrying out a further one day survey in the company of EN personnel.

2. Methodology

All of the field methods used for the present survey were the same as those used for the two original surveys. The work essentially comprised an observational review of the snail-rich sites identified previously. In addition, field surveying was carried out along the river margins upstream of Home Bridge which had been identified as a possible site for the snail.

3. Site descriptions

The location of each site with brief habitat descriptions and comments on the the abundance of *Vertigo moulinsiana* are also given on the maps. [**Note**: Maps are not included in this report but are held by English Nature, Devizes.]

3.1 Hurdcott - Mixed fen, depressions with sedge and *Glyceria*, raised areas with *Filipendula*, nettles and tall herbs. *Vertigo moulinsiana* distributed throughout in the wetter depressions, commonest in the fringe of sedge along the river margin towards the southern end.

3.2 East side of river, south of Home Bridge - Mixed fen mainly dominated by *Filipendula* and herbs. River margins with sedge, *Sparganium* and *Glyceria*. *Vertigo moulinsiana* sparsely distributed throughout the wetter areas but more frequent along the river margins.

3.3 West side of river, south of Home Bridge - Most of the area appears to be rough pasture that has reverted to wetland. It is dominated by tall herbs and is generally too dry for the snail. The fringe of sedge and *Sparganium* does support low numbers of *Vertigo moulinsiana*.

3.4 Home Bridge to next footbridge upstream - The north bank of the river has a more or less continuous fringe of *Carex acutiformis* which is dense in places and extends into the adjacent woodland. The south bank has less of a sedge margin but there are areas of *Glyceria* swamp. *Vertigo moulinsiana* was found throughout the marginal strip and even into the wet woodland where the sedge was dense. It was particularly abundant on the sedge fringing the north bank.

3.5 Footbridge to ford - Wooded footpath along south bank with occasional clumps of sedge, alder carr along the north bank. *Vertigo moulinsiana* was found sparsely on the sedge fringing the alder carr and the small ditches running into the river.

3.6 Upstream of ford - Narrow fringe with patchy sedge, *Glyceria* and *Sparganium*. Occasional specimens of *Vertigo moulinsiana* found.

3.7 Winterbourne Gunner - Small swamp on east bank of river dominated by *Carex acutiformis*. *Vertigo moulinsiana* abundant. The snail was much less common in the sedge fringing the river. Areas of sedge potentially suitable for the snail were observed upstream but not accessed due to uncertainty over ownership.

3.8 West Gomeldon (part of Porton Meadows SSSI) - *Vertigo moulinsiana* had previously been found commonly on sedge at SU18163597. There are many similar sites within the SSSI which are almost certain to support the snail but were not confirmed as access for this survey had not been obtained.

4. Summary of work & recommendations

There are populations of *Vertigo moulinsiana* along the River Bourne that are equal in size and density to those at many of the other sites within the Avon catchment, in particular Sites 3.4, 3.7 and 3.8. On this basis it is again recommended that part of the Bourne should be included within the Avon pSSSI.

In order to simplify the boundaries it is recommended that only the areas with good populations of *Vertigo moulinsiana* be included. The maps (Figures 1 & 2) are marked in red with hatched and solid areas. The latter represents the areas with the densest populations and are thus marking the suggested SSSI boundary. As all of the known and potential *Vertigo moulinsiana* habitat north of Gomeldon is already within Porton Meadows SSSI, a boundary has not been marked.

The site at Winterbourne Gunner (3.7) is rather overgrown with encroaching trees and scrub where it bounds the river at the north end. The habitat could be enhanced and expanded for the snail by some clearance work. Similarly the snail habitat at Hurdcott (3.1) could be expanded by the creation of more depressions in which swamp conditions could develop.

Vertigo moulinsiana survey of sites in Hertfordshire and Essex, March 1996

P. Kirby

30 March 1995

Summary

1. Six sites in Essex and Hertfordshire were surveyed for *Vertigo moulinsiana* in late March 1996.

2. The continued presence of *V. moulinsiana* was confirmed at two sites from which there were previous records this century: the River Colne near Harefield, and Sawbridgeworth Marsh SSSI. At both sites the snails were found at high density. However, though the Sawbridgeworth population inhabits a large area of managed marsh, that on the Colne is confined to a short and isolated stretch of vegetation at the river margin.

3. *V. moulinsiana* was not found at Hunsdon Mead SSSI, a site from which it had previously been recorded. The structure of the vegetation over most of site did not appear suitable, and it is possible that management changes have resulted in the loss of the snail.

4. *V. moulinsiana* was not found at Croxley Common Moor SSSI at the confluence of the Gade and Cole, despite the presence of apparently suitable habitat.

5. Two additional sites for *V. moulinsiana* were identified along the Stort: Little Hallingbury Marsh and Thorley Flood Pound. The populations in both sites appear sparse.

6. The strongest population of *V. moulinsiana* identified by the survey is that at Sawbridgeworth Marsh. However, others along the Stort, at Little Hallingbury Marsh and Thorley Flood Pound, may be large because at both sites the extent of available habitat is considerable. The population of the Colne near Harefield is considered both small and vulnerable.

7. Other sites apparently suitable for *V. moulinsiana* exist along both the Colne and the Stort in the vicinity of sites where *V. moulinsiana* was recorded by the present survey. Brief sampling at several points along the Colne did not reveal any additional populations. No additional samples were taken along the Stort.

1. Introduction

1.1 *V. moulinsiana* is an inhabitant of long-established swamps, fens and marshes, usually bordering rivers and lakes. It is associated with living and dead stems of tall grasses and sedges, on which the snails climb; they are rarely found in litter. Recent records have been especially associated with tall sedges (*Carex riparia* and *C. acutiformis*) and reed sweet-grass (*Glyceria maxima*) (Bratton 1991, Killeen 1996).

1.2 As part of its work to achieve compliance with the Habitats and Species Directive, JNCC is required to advise the DoE on the designation of SACs for *Vertigo moulinsiana*. Following the discovery of an extensive population in the Kennet and Lambourne

Valleys, EN require urgent information about the status of the species at other known or possible sites in England, to inform their decision about possible SACs, and to enable a more accurate understanding of the range of the snail and the strength of its populations outside its strongholds in Norfolk and Suffolk.

1.3 This report covers surveys of the following six sites in Hertfordshire and Essex:

Croxley Common Moor SSSI, TQ083949 (confluence of rivers Gade and Colne)
Hunsdon Mead, TL418110 (River Stort)
Little Hallingbury Marsh SSSI, TL492171 (River Stort)
River Colne near Harefield, TQ043929
Sawbridgeworth Marsh SSSI, TL491158 (River Stort)
Thorley Flood Pound SSSI, TL489182 (River Stort)

1.4 The aims of the survey were:

- to survey the three sites in Hertfordshire and Essex (Hunsdon Mead, River Colne near Harefield, and Sawbridgeworth Marsh) where *Vertigo moulinsiana* had previously been recorded this century;
- to survey other SSSIs in Essex and Hertfordshire where the habitat is likely to be suitable for *V. moulinsiana.*
- to provide an approximate indication of the strength and local extent of any *V. moulinsiana* populations recorded

2. Methods

2.1 Croxley Common Moor and the River Colne near Harefield were visited on 23 March; the remaining sites on 27 March 1996. A minimum of one hour was spent on each site; for all sites except the River Colne near Harefield the total field time spent was between one and a half and two hours. Some additional sites along the Colne were briefly sampled; a maximum of fifteen minutes was spent at each of these additional sample stations. The weather on both days of fieldwork was fine and intermittently sunny. March 23 was calm; March 27 was rather windy during the morning, calming in the afternoon. On both days the tall vegetation which was the subject of most sampling effort was dry.

2.2 Survey methods for *V. moulinsiana* largely followed those of Killeen (1996). Carex spp. and *Glyceria maxima* were beaten to release snails. However, whereas Killeen used a sheet of heavy duty polythene to catch beaten material, it was found simpler in the present survey to use a rigid white shallow plastic tray, which could be quickly and easily inserted at the base of plants to be beaten and on which subsequent search for *V. moulinsiana* was straightforward. At sites where *V. moulinsiana* was not detected in the field, beaten material was placed in polythene bags and taken away for closer examination.

2.3 Sweep-netting, not employed by Killeen, was also used on occasion to supplement beating. A triangular frame with a width of 50 centimetres, fitted with a standard white entomological nylon mesh net bag was used to sample short vegetation where beating was impractical but where hand-searching would have been very time-consuming. This method was used in sampling recently cut sedge beds at Sawbridgeworth Marsh, grazed areas at Hunsdon Mead and Thorley Flood Pound, and new growth of *Glyceria maxima* at Little Hallingbury Marsh in two areas where the previous years growth was rotted into a mat on the ground and the new growth was only some ten centimetres tall.

2.4 Records were made of some invertebrates other than *V. moulinsiana*. No target groups were selected at the outset of survey, and there is not necessarily absolute consistency between samples in the thoroughness of recording. Species were identified which were immediately identifiable in the field, or which the recorder felt able readily to identify subsequently, or which seemed to be present with particular consistency or in especially large numbers. All molluscs captured were identified. However, records are strictly limited to those species which were found by the methods used for searching for *V. moulinsiana*.

3. Results

3.1 Croxley Common Moor

3.1.1 Only a small part of this site supported habitat suitable for *V. moulinsiana*: tall fen towards the western end of the site and beds of tall *Carex* and reed sweet-grass *Glyceria maxima* along the river Gade. Suitable beds of riverside vegetation were most frequent along the western half of the length of the river bordering the SSSI, but also occurred over small stretches further to the east. However, in the east the river banks were quite steeply angled, horse-grazed and disturbed, so tall vegetation was mostly limited to a narrow fringe, especially where sheltered by scrub. There were also extensive beds of *Carex* and *Glyceria*, locally intermixed with *Phragmites*, and a small area with tussock sedge *Carex paniculata*, on the northern bank of the Gade opposite the SSSI, again best-developed in the west.

3.1.2 All areas with vegetation of suitable structure were sampled. No *V. moulinsiana* were found.

3.2 Hunsdon Mead

3.2.1 Only a small part of this site supported vegetation suitable for *V. moulinsiana*. The larger portion of the SSSI, north of the Stort Navigation, was almost uniformly grazed and short, even in lower-lying hollows, and structurally quite unsuitable. Small amounts of tall *Carex* were scattered around the edges of the field, especially bordering the raised towpath along the Stort Navigation, mostly under partial scrub shade. A small area was found where somewhat tussocky structure remained, with scattered sedges and rushes growing rather taller than the surrounding vegetation, but even here grazing was clearly too heavy to maintain the vegetation structure preferred by *V. moulinsiana*.

3.2.2 The part of the SSSI to the south of the Stort Navigation was structurally better for V. moulinsiana, with sedge growing relatively tall (though typically grazed to thirty centimetres or less), especially close to the Stort at TL420109 and beneath willow shade at TL418108. Such vegetation, however, occupied only a small proportion of the southern part of the SSSI.

3.2.3 A narrow fringe of tall sedge grew along considerable lengths of the margin of the Stort Navigation, though in places in was grazed quite short, elsewhere suppressed or excluded by shading scrub, in places restricted to emergent stems from quite deep water, or poorly growing plants on rather dry ground, by the very abrupt margin, and almost always a very narrow, usually emergent fringe. A single rather broader bed extending from shallow water to relatively dry ground was seen.

3.2.4 Samples were taken by beating from the limited areas of tall sedge seen on the north side of the Stort, along the margins of the Stort itself, and from the moderately grazed sedge south of the Stort. Sweep-netting was sued to sample shorter grazed sedge areas both north and south of the river. No *V. moulinsiana* were found.

3.2.5 Several areas of vegetation apparently more structurally suited to supporting *V. moulinsiana* were seen between Hunsdon Mead and the next sampled site upstream at Sawbridgeworth Marsh, especially near Harlow (close to the A1019 crossing, and between there and the A122 crossing) and at Sawbridgeworth itself, between the railway line and the river north of the A414.

3.3 Little Hallingbury Marsh

3.3.1 A large area of unmanaged and mostly very dense sedge. At the time of survey much of it was over shallow water, a few centimetres deep at most, but towards the margins a relatively narrow fringe was on more drier ground. The area formerly occupied by a large pool was mostly occupied by *Glyceria maxima* and *Typha latifolia*, except where recent excavation had re-created open water. There were small patches dominated by *Glyceria maxima* elsewhere. There were large willows near the site of the pool, and moderate invasion by young willow scrub elsewhere. The sedge merged into tall herb vegetation, with nettle *Urtica dioica* and cleavers *Galium aparine* prominent, close to the towpath along the Stort Navigation.

3.3.2 The sedge was extensively sampled. The *Glyceria*, except where it occurred intermixed with sedge, was less easily sampled, being generally rather well-rotted and flattened into the underlying water. It was sampled by beating where its structure allowed it, and elsewhere new growth was sampled by sweep-netting.

3.3.3 *Vertigo moulinsiana* was found rarely. Only one adult and two juvenile shells were found by beating sedges. None were found on *Glyceria*. Though the population is seemingly sparse, it could nonetheless be quite large overall, because a quite extensive area of habitat is available.

3.4 River Colne near Harefield

3.4.1 A bed of tall *Carex* approximately 40 metres long and up to four metres wide (though mostly narrower), emergent at its rivermost edge and merging with tall herb vegetation on relatively dry ground to landward, bordering the southern margin of the river close to its junction with the Grand Union Canal, and backing onto a slope with tall herbs, unmanaged grassland, willows of varying ages and some open scrub along the edge of a car park. The bed also contained a small amount of *Glyceria maxima* and bulrush *Typha latifolia*. Parts of the bed had suffered considerable disturbance, with much trampling and localised erosion, from visitors from the car park. At its western end the bed abuts the bridge leading to a pumping station. Between the pumping station bridge and the canal towpath bridge is a very small triangle of *Glyceria maxima*, approximately 2.5 metres across.

3.4.2 *Vertigo moulinsiana* was found commonly over a length of approximately 15 metres of the sedge bed, and in smaller numbers in the *Glyceria* triangle. The snails were most frequent in vegetation close to the river, the numbers found falling rapidly further away. Roughly sixty *V. moulinsiana* were seen altogether, which in view of the limited extent of the colony and the fact that not all suitable vegetation was sampled, implies a high density. The part of the bed where *V. moulinsiana* was found was in the least disturbed part. The

eastern limit of the recorded extent of the colony was marked by an eroded area devoid of *Carex* at the river margin, under partial shade of tall willows.

3.4.3 There was a similar, but less disturbed, sedge bed on the opposite bank of the river to that surveyed, but access was not possible. Apart from these two sedge beds, there was no suitable vegetation for some distance along either the river or the canal. The canal, for at least a kilometre after its junction with the Colne and as far as Rickmansworth in the other direction, supports no suitable vegetation. The Colne itself for some distance upstream of the sedge bed is mostly lined by tall herbs and brambles, with only very localised small areas of *Glyceria*. The Colne was followed, as far as access permitted, back to Rickmansworth. Possible sites for *V. moulinsiana* were examined near to Stockers Lake, where a narrow and intermittent fringe of tall sedge lined the river between rather close-set willows; just beyond the point where the river curves away from the lake, where a moderately large bed of sedge over shallow water and soft mud marked a bend in the river, and near to the junction of the river with the canal at Rickmansworth, where there was a narrow fringe of emergent sedge, occasionally broadening and extending onto rather drier land, though showing clear signs of disturbance by fishermen. All samples proved negative, but sampling was not long extended and was restricted to the southern bank.

3.5 Sawbridgeworth Marsh

3.5.1 Tall fen vegetation at this site included sedge beds, rush-dominated meadows, and *Phragmites* beds. Some of the sedge was under partial willow shade. There were extensive areas of mixed tall herbs towards the river margin. Parts of the marsh, including the sedge beds, are managed by cutting; several compartments had been cut in 1995, and in these new sedge growth was only a few centimetres tall. Large amounts of cut vegetation were piled into heaps in and adjoining the cut compartments.

3.5.2 Beating was used to sample tall fen vegetation over a wide area of the site. Regrowth in recently cut sedge beds and rush-dominated meadows was sampled by sweep-netting.

3.5.3 *Vertigo moulinsiana* was common in all sedge-dominated areas of the site. Several hundred snails were seen overall. In recently cut compartments it could easily be swept from short re-growth. It was apparently more frequent towards the southern end of the site, but this may be an artefact, since sampling was also easier in these more managed areas. *V. moulinsiana* was present in moderate numbers in areas of mixed sedge and *Phragmites*, certainly up to a 50:50 mix. It was absent from areas of *Phragmites* domination, from the rushy meadows, and from tall herb communities, and was found only rarely beneath willow shade. Living snails were also found in small numbers by beating piles of cut vegetation, though whether they arrived with cut sedge or colonised the piles after cutting is impossible to say.

3.5.4 The area occupied by this colony is considerable; it probably occurs over at least a third of the site, and at high density over a quarter. It is almost certainly the largest colony seen during the present survey.

3.6 Thorley Flood Pound

3.6.1 An extensive area of fen vegetation subjected to only light horse grazing as management. A substantial proportion of the open fen area was dominated by tall sedges, though there was considerable variation in the detail of the vegetation and some areas were dominated by rushes or tall herb vegetation. There were many willows of various ages, notably

including old and disintegrating trees. Light grazing had resulted in variation in structure within the sedge-dominated areas, with some relatively heavily grazed and trampled areas relatively open-structured with young re-growth only a few centimetres tall amongst litter almost or quite flat on the ground, and other areas with tall dense ungrazed sedge. The site was wetter in the south, where much of the sedge was in very shallow (a few centimetres at most) water; there was no standing water, except in pools and ditches, to the north of the footpath through the site. Most of the sedge was in fairly open situations, but there was a large amount also in at least partial shade, and a substantial quantity amongst dense old willows close to the Stort Navigation in the southern part of the site. Though most of the sedge was on fairly level ground, it also grew as an emergent in ditches.

3.6.2 Tall sedge was sampled by beating over a wide area of the site, concentrating on plants in more open areas but also including those under partial shade. Sweep-netting was used to sample short re-growth in grazed areas.

3.6.3 Three adult and four juvenile *V. moulinsiana* were captured in total. They came from both north and south of the footpath through the site, and from unshaded vegetation, but since none were seen in the field their exact locations of capture are not known. The small numbers captured after considerable recording effort suggest a rather sparse population, but in view of the considerable extent of apparently suitable vegetation, the total population could be large.

3.6.4 There are several further areas of apparently suitable vegetation for *V. moulinsiana* along the Stort Navigation between Thorley Flood Pound and Bishops Stortford.

4. Discussion

4.1 The results of this survey confirm that beating is a suitable method of sampling *Vertigo moulinsiana* from tall *Carex* (*C. acutiformis/riparia*) in March. Though it was also successful in capturing *V. moulinsiana* from *Glyceria maxima* at one site (River Colne near Harefield) where the *Glyceria* was sheltered and relatively upright, in some other places *Glyceria maxima* was less easy to sample than *Carex*. Being of a less stiff structure and more prone to collapse and rot over the winter, especially where subjected to prolonged flooding, its structure in March is less often suitable for beating. A greater proportion of false negatives might perhaps be expected from surveys of *Glyceria* than of *Carex*. On the other hand, it may be, considering the habits of *Vertigo moulinsiana*, that the factors which make *Glyceria* stands prone to widespread collapse and rotting also render them less suitable for the snail. For interpreting the results of the present survey, this is academic: all surveyed sites contained tall sedges, and most of the survey effort was expended on sampling tall sedges.

4.2 The 1996 survey confirms the continued existence of *V. moulinsiana* at two of the three sites in Essex and Hertfordshire from which it had previously been recorded this century and, moreover, show it to be present in good numbers. Failure to find *V. moulinsiana* at Hunsdon Mead may well result from habitat change. The area of Hunsdon Mead north of the Stort Navigation, where the earlier record appears to have been made, does not seem suitable for the snail, and its continued survival there, unless it occurs along the margin of the river itself, does not seem likely. It is more likely to occur to the south of the Stort, but if so the population seems likely to be small.

4.3 Both the additional sites along the Stort (Little Hallingbury Marsh and Thorley Flood Pound) proved to contain *V. moulinsiana*, though at low density compared with the known site at Sawbridgeworth Marsh (and also compared with the colony on the Colne).

There are other sites along the Stort which appear structurally suitable for the snail, which in this stretch at least could be quite widespread.

4.4 It is interesting, though perhaps unsurprising, that both the previously known sites where *V. moulinsiana* has been re-recorded in 1996 support high densities of the snail. It is very easy to overlook *V. moulinsiana* if it occurs at low density. Shells can be very inconspicuous on dead sedge or amongst fragments beaten from sedge. Despite the presence of seven individuals in the beatings obtained from Thorley Flood Pound, for example, *V. moulinsiana* was not detected in the field, even though it was the sole object of search. Further, because of its climbing habits, it may be missed by general mollusc survey.

4.5 On current evidence, the strongest population of *V. moulinsiana* amongst those recorded by the present survey is that at Sawbridgeworth Marsh. At this site it was both widespread and common. Moreover, it was present in considerable numbers in areas under active management, suggesting (though not necessarily proving, in the long term) that the current management regime is suited to the continued maintenance of the snail. The populations at Little Hallingbury Marsh and Thorley Flood Pound, especially the latter, could nonetheless be quite large, because the area of suitable habitat is considerable. In contrast, the population on the Colne near Harefield, though it has a high density of snails, must be considered small and vulnerable, since it is subject to uncontrolled public access, is of very limited extent and, apart from the unsurveyed sedge bed on the opposite side of the river, is isolated by some distance from the nearest other possible *V. moulinsiana* site.

5. References

BRATTON, J.H. (ed.) 1991. *British Red Data Books: 3. Invertebrates other than insects.* Peterborough: Joint Nature Conservation Committee.

KILLEEN, I.J. 1996. An assessment of the status and distribution of the terrestrial pulmonate snail *Vertigo moulinsiana* (Dupuy) in the Kennet and Lambourn Valleys, Berkshire. Unpublished report to English Nature.

Appendix

Other invertebrate species recorded during survey

Species	Status	Sites					
		CCM	HM	LHM	RCnH	SM	TFP
Mollusca							
Arianta arbustorum	c	+	.	.	.	.	+
Ashfordia granulata	l	.	.	.	+	+	+
Carychium minimum	c	+	.	.	.	+	.
Cepaea nemoralis	c	.	+	.	.	+	+
Clausilia bidentata	c	.	.	.	.	.	+
Cochlicopa lubrica	c	.	.	.	.	.	+
Deroceras laeve	c	+	.	.	.	+	+
Discus rotundatus	c	.	.	.	+	.	+
Euconulus alderi	l	.	+	+	+	+	+
Lymnaea truncatula	c	+	+	.	.	.	.
Oxychilus alliarius	c	.	.	.	.	+	.
Punctum pygmaeum	c	+	.	.	+	.	.
Succinea putris	c	+	+	+	+	+	+
Trichia hispida	c	+	.	.	.	.	.
Vitrea crystallina	c	.	.	.	+	.	.
Zonitoides nitidus	c	+	+	+	+	+	+
Crustacea (Isopoda)							
Oniscus asellus	c	+	+	.	.	+	.
Philoscia muscorum	c	+	+	+	+	+	+
Trichoniscus pusillus	c	+	+	.	+	+	+
Myriapoda (Diplopoda)							
Brachyiulus pusillus	c	+	.	.	+	.	+
Cylindroiulus britannicus	c	+	.	.	+	.	.
Polydesmus gallicus	c	+	+	+	.	.	.
Tachypodiulus niger	c	+	.	.	.	.	.
Coleoptera							
Apionidae							
Nanophyes marmoratus	c	.	.	.	.	.	+
Bruchidae							
Bruchus rufipes	l	.	.	.	.	.	+
Carabidae							
Agonum obscurum	l	.	.	+	.	.	.
Agonum thoreyi	l	.	.	+	.	+	+
Bembidion assimile	c	.	.	+	.	+	+
Bembidion unicolor	c	+	.	.	.	.	+
Demetrias atricapillus	c	+	+	+	+	+	+
Demetrias imperialis	Nb	.	.	+	.	.	.
Demetrias monostigma	Nb	.	.	.	+	.	.
Dromius linearis	c	+	+	+	+	+	+
Dromius melanocephalus	c	+	+	+	+	+	+
Pterostichus strenuus	c	.	.	+	.	+	.
Trichocellus placidus	l	+	.	.	.	+	+
Chrysomelidae							
Chaetocnema concinna	c	.	+	.	.	+	.
Chrysolina polita	c	+	.	.	.	+	+
Epitrix pubescens	l	.	.	.	+	+	.
Galerucella lineola	c	.	.	+	.	.	+

Species	Status	Sites CCM	HM	LHM	RCnH	SM	TFP
Galerucella tenella	c	.	.	.	.	.	+
Hippuriphila modeeri	l	.	.	.	.	+	.
Phyllotreta exclamationis	l	.	.	.	+	.	.
Phyllotreta nigripes	l	.	.	.	.+	.	.
Prasocuris junci	l	+	.	.	.	.	.
Prasocuris phelandrii	l	.	.	.	.	+	.
Coccinellidae							
Anisosticta 9-punctata	l	+	+	+	+	+	+
Coccidula rufa	c	+	+	+	+	+	+
Rhyzobius litura	c	.	+	.	.	.	+
Scymnus haemorrhoidalis	c	.	+	+	.	.	+
Tytthaspis 16-punctata	c	.	.	+	.	.	.
Cryptophagidae							
Telmatophilus caricis	c	+	+	.	+	+	.
Curculionidae							
Ceutorhynchus pallidactylus	c	.	.	.	.	+	.
Cionus tuberculosus	l	.	.	.	.	+	+
Datonychus melanostictus	l	.	.	.	.	.	+
Drupenatus nasturtii	Nb	.	.	.	+	.	.
Hypera rumicis	c	.	.	.	.	+	+
Hypera pollux	c	.	.	.	.	+	.
Hypera suspiciosa	l	.	.	.	.	+	.
Hydrophilidae							
Anacaena globulus	c	+	.	.	+	.	.
Anacaena limbata	c	.	.	.	+	.	.
Phalacridae							
Phalacrus caricis	l	.	+	.	.	+	.
Pselaphidae							
Reichenbachia juncorum	c	.	.	.	.	+	.
Silphidae							
Phosphuga atrata	c	+	.	.	.	.	.
Silvanidae							
Psammoecus bipunctatus	l	+	+	+	+	+	+
Staphylinidae							
Anotylus rugosus	c	.	+	+	.	+	.
Euastethus ruficapillus	l	.	.	+	.	+	+
Lathrobium terminatum	c	.	.	.	.	+	.
Quedius fuliginosus	c	.	.	.	.	+	.
Rugilus fragilis	N	.	.	.	.	+	.
Rugilus orbiculatus	l	.	.	.	.	+	.
Rugilus rufipes	c	.	.	.	.	+	.
Sepedophilus litoreus	l	.	.	.	.	+	.
Stenus bifoveolatus	c	.	.	.	.	.	+
Stenus bimaculatus	c	+	+	.	.	+	.
Stenus boops	c	+	+	.	.	.	.
Stenus flavipes	c	+	+	.	+	.	+
Stenus juno	c	+	.	.	.	+	.
Stenus latifrons	l	+	+	+	+	+	+
Stenus pallitarsis	c	+	.	.	.	.	.
Stenus pubescens	c	.	.	.	+	.	.
Stenus rogeri	c	.	.	.	.	+	.

Species	Status	Sites					
		CCM	HM	LHM	RCnH	SM	TFP
Stenus solutus	l	+	+	+	+	+	+
Tachyporus chrysomelinus	c	.	.	+	.	+	.
Tachyporus hypnorum	c	+	+	+	+	+	+
Diptera							
Dolichopodidae							
Achalcus cinereus	c	+	+	+	+	+	+
Sympycnus desoutteri	c	.	.	.	.	.	+
Hemiptera							
Auchenorhyncha							
Anakelisia fasciata	l	+	+	+	+	+	+
Stenocranus major	c	.	.	.	.	+	.
Heteroptera							
Acompus rufipes	l	.	.	.	.	+	+
Chartoscirta cincta	c	+	+	+	+	+	+
Cymus glandicolor	c	+	.	.	.	+	.
Cymus melanocephalus	c	.	.	.	.	+	.
Drymus brunneus	c	+	.	.	.	.	.
Drymus pumilio	Nb	.	.	.	.	+	.
Gerris lacustris	c	+	.	.	.	.	.
Hydrometra stagnorum	c	+	+	.	+	.	+
Ischnodemus sabuleti	c	+	+	+	+	+	+
Peritrechus geniculatus	c	+	.	.	.	.	.
Peritrechus nubilus	l	.	.	.	.	+	.
Scolopostethus puberulus	l	+	+	+	+	+	+
Tingis ampliata	c	.	.	+	.	.	.
Zicrona caerulea	l	.	.	.	.	+	+
Lepidoptera							
Philudoria potatoria	c	+	.	.	+	+	+

Distribution of *Vertigo moulinsiana* (Dupuy, 1849) in Europe

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1996

Summary

In the review for the 1996 Red List of Globally Threatened Molluscs the conclusion will be that the status of *Vertigo moulinsiana* is Conservation Dependant, given that:

- in many countries the habitat of this species is threatened;
- there are low numbers of known sites in any single country;
- and the species is very vulnerable to changes in humidity.

In the western part of the distribution, on the basis of the present state of knowledge, the UK and Ireland hold significant percentages of the total global populations.

Most of the decline in the range of this species happened in historical times, but there has also been a decline throughout the last 5000 years related to climatic changes in Europe. In general, the range has dropped to 30%-40% of the original sites known in 1930.

If conservation measures are not applied through designation of a network of SACs (within the EU) and protected areas (outside EU), there may be a continued decline in available habitat and, by extension, the species.

It does seem clear that specialised survey work may well increase the number of sites at which the species is known, as it can clearly survive in small pockets of suitable habitat provided humidity levels are maintained and the sites are sufficiently open. Therefore, the conservation status of this species must be reviewed on a regular basis; if there is a significant increase in the known distribution, it could be removed from the Global List.

1. Introduction

The genus *Vertigo* has a Holarctic distribution. Some species are found in North America and Eurasia whereas other species, tending to be those with more specific habitat requirements, are more restricted in their distribution. All the species are found in the more humid countries, often in fen and marsh type habitats. Due to their small size, they tend to be overlooked and the majority of records come from searching leaf-litter samples. Field recording does become more important for those species which live up on the vegetation, rather than in the litter itself, as they may be under-represented in litter samples.

Vertigo moulinsiana is considered to be a Palaearctic species (Kerney & Cameron, 1979) with the main centres of known distribution in the western part of the region (Pokryszko, 1990). The species ranges from Ireland to the Caucasus (former Soviet Region) and south to North Africa, with the main populations in western and central Europe (Pilsbry, 1919; Germain, 1930;

Pokryszko, 1990; Seddon & Holyoak, 1993). The southern limits of the distribution are poorly known, reflecting the paucity of data and the difficulty of recording the species.

The species mainly inhabits calcareous wetlands throughout the range. The habitats are vulnerable to disturbance and drainage and as such the decline in the area of habitat has been mirrored by a decline in the range of the animal. This led to the placement of this species onto the 1983, 1987 and 1990 Red List of Globally Threatened Molluscs. In 1993, the species was removed from the Global List as there was some evidence to suggest that the decline was stabilising, and remnant patches of habitat may have been sufficient to maintain populations. The re-definition of the criteria in 1994 for classification of endangered species increased the range of classes, introducing Conservation Dependent which is used for animals and plants where conservation actions are in place to stabilise the status of the species, but, if removed, the animals may move into one of the higher classes. This class applies to *Vertigo moulinsiana.*

2. Causes of decline

Historically, there is evidence in the UK that this snail's overall decline in Europe may in part be due to gradual cooling since the climatic optimum around 5000 years BP (Bratton, 1991). There is considerable evidence that this species is declining throughout much of its range with the main potential causes being hydrological (drainage of fens and marshes), changes in management practice (mowing), scrub encroachment onto fen, change of land use and development. In Sweden, Poland, Netherlands and Belgium the evidence points more to drainage of fen habitats in the last century.

3. Habitat and lifestyle

The general habitat can be divided into fringe fens (along rivers and lakes) and closed basin fens (former pingos, kettleholes, etc). These occur in areas which are non-acidic (mainly base-rich, calcareous areas, although in some areas *Vertigo moulinsiana* will occur in less base-rich situations), and which support tall vegetation (*Carex, Glyceria, Phragmites*) in a permanently wet situation.

Little is known of the lifestyle of *Vertigo moulinsiana.* The few descriptions suggest that they are gregarious and ovaviviparous. The animals are most probably annuals; specimens found in the autumn all have fully developed shell characters. Their food is unknown but Pokryszko (*in litt.*) suspects that the animals browse micro-fungi. The life history of another European vertiginid, *Vertigo pusilla,* is given by Pokryszko (1992).

4. Nomenclature

Vertigo moulinsiana (Dupuy, 1849)
Synonyms:
V. charpentieri Shuttleworth 1852
V. laevigata Gallenstein, 1852
V. fimbata (Moquin-Tandon, 1855)
V. codia (Bourguignat, 1866)
V. desmoulinsi Germain 1913

Taxonomically, there are problems in the southern regions around the Mediterranean with old 'species' which have similar characters to those of *V. moulinsiana* and are probably conspecific with it; these include *V. graelisiana* recorded from Zaragoza and Granada in Spain (Servain 1880). Recent examination of the type material of *V. codia* Bourguignat from Algeria shows that this 'species' is, on shell characters, within the range of *V. moulinsiana* and as such should be

synonymised (Seddon, pers. observation). This suggests a continuous but local distribution for *V. moulinsiana* through Spain to NW Africa, similar to the pattern for *Leiostyla anglica* (Seddon, Holyoak & Tattersfield, 1993).

5. Range information

Total known range: European Union (mainly France, southeast United Kingdom, central Ireland, southwestern Germany and northern Italy; scattered populations in Belgium, Netherlands, Denmark, Sweden, Austria and Spain). Central and eastern Europe: Switzerland, Poland, Czech Republic, Slovakia, Hungary, Bulgaria, northwest Turkey, Lithuania, Georgia, Azerbaijan. North Africa: Morocco and Algeria (Seddon & Holyoak, 1993; see above).

Algeria Status uncertain (probably extinct?)

Old records (1860s) come from around Algiers, based partly on material obtained from floodline debris from rivers. Given the large areas of agricultural and industrial development here, it is unlikely that suitable habitats survive.

Austria Status uncertain - possibly Vulnerable B 1 a, b d

Records come from seven sites (Klemm, 1974), mainly around the Wőrther See and on the Gurk and Drava rivers draining this catchment, and the Neusiedler See. According to Frank (*in litt.* 4/1996), the species is now known only from Carynthia (southern part of Austria, south of the Alps), but no data were provided on whether it still exists at all six of Klemm's sites. The status of the sites around the Neusiedler See is not indicated, suggesting extinction there. There are no new findings reported and no work is known. The species is hydrophilic and lives in wet meadows and on the border of swamps and marshes. Reischutz (*in litt.*, 4/1996) notes that little recording has been carried out in the last ten years and, to his knowledge, none has been planned, so the present status in Austria is very uncertain. *Vertigo moulinsiana* is listed in the Austrian Red List as a Category 1 species Data Book (Frank & Reischutz, 1993).

Belgium Vulnerable (amended from possibly extinct)

The species was thought to be extinct and listed as last recorded in 1960 (Wells & Chatfield, 1992). The former distribution is given in de Wilde, Marquet & van Goethem (1986). However, the species has been recently discovered in five 10km squares across Belgium in surveys instigated as a result of the Habitats & Species Directive (van Goethem, *in litt.*, 4/1996). There are post-1987 records from Han-sur-Lesse (FR55). In the region of Neerijse (F513) and Velm (F542), there unconfirmed records at ten sites (*in litt* 2/1996, van Goethem, 4/1996) and this would indicate that there may be remnants of suitable habitats and a metapopulation of *Vertigo moulinsiana* occupying these. Old records come from La Hulpe and Genval, southeast of Brussels (Adam, 1944, 1960).

Two sites (Han-sur-Lesse, Damme) are protected areas. According to van Goetham, sites in Belgium are presently being considered for SAC status for *Vertigo moulinsiana.*

Bulgaria Status unknown

Vertigo moulinsiana is not listed in recent handbooks to the region but old records come from Philippopel and Maritzadal (Hesse, 1916).

Czech Republic Endangered

Vertigo mounlinsiana is local but rare and declining (recorded from Jasov, Teplicadal and Bardejov; Lozek, 1956). Details of its distribution, ecology and conservation are given in Lozek & Steffek (1983).

Denmark Current status insufficiently known

Vertigo mounlinsiana is known mainly in the southeast and in Jutland but most records are either old or refer to populations known to have been destroyed (Wells & Chatfield, 1992): Laaland, Langeland and Funen (Schlesch, 1943). Studies on Jutland populations were carried out by Bondesen (1966). Several new populations have been recently discovered by Walden (Wells & Chatfield, 1992) but no data have been obtained yet on the status of these populations.

Finland Not recorded

Former USSR Status unknown

The true distribution is poorly known but is summarised by Likharev & Rammel'meier (1962). Essentially, *Vertigo mounlinsiana* has a western distribution from Lithuania to western Georgia and western Azerbaijan. No detailed mapping scheme is in place, hence the poor level of knowledge of the distribution of the species.

France Current status insufficiently known

Recent records are from near Reims (Chatfield & Stevanovitch, 1986), the National Reserve de Chasse (UTM reference CN 97) in Loire-et-Cher (Colville, 1985), and Sangatte, 8 km west of Calais (Kuiper, 1980). Bouchet & Ripken (pers. comm. 3/1996) are not aware of any recent survey work specifically for this species. Pre-1930 records exist from Departments: l'Ain, l'Aisne, l'Oise, Bas Rhin, Haute Garonne and Gironde (Germain, 1930). In Lyons (type locality) and Toulouse, there is a different shell form (var. *personata* Mousson, 1855, fide Germain, 1930).

Germain (1930) gives its habit in France as living on the stems and leaves of aquatic plants (*Carex, Glyceria, Juncus*), often with *Succinea putris*. Colville (1985) found the species under *Carex* and *Glyceria maxima* in an open area of forest. At this site, other *Vertigo* species recorded were *V. antivertigo* and *V. substriata*.

At present *Vertigo moulinsiana* is not on the protected list of invertebrates in France.

Germany Vulnerable (Bla,b,d)

Vertigo moulinsiana is declining but has a widespread distribution of scattered populations mainly along the western and southern borders, with occasional sites in the east. Distribution maps for some regions are given by Ant (1963, 1976) and Jungbluth (1993). Most populations are threatened (e. g. Falkner, 1990). The species has been listed in most regional Red Data Books or Threatened Species Lists: West (Ant & Jungbluth, 1984), Hesse (Jungbluth, 1987), Bavaria (Falkner, 1990), Baden-Wurttembergs (Jungbluth & Burk, 1985), Schleswig-Holstein (Anon, 1982), and Nordrhein-Westfalen (Ant & Jungbluth, 1987).

Hungary Apparently not threatened

Vertigo moulinsiana is widespread but locally distributed, known from the Budapest area, north of Lake Balaton, and other sites in the south and far east. The total number of sites listed by Pinter, Richnovsky & Szigethy (1979) is 24 [10km squares?], some of which are likely to be previously continuous habitats fringing lakes but now largely separate.

Vertigo moulinsiana is viewed as a characteristic montane, wetland species in Hungary. Data on the habitats in one area in the east of Hungary are given in Nyilas & Sűmegi (1991). In this region, the sand-dunes (Pleistocene relicts) surround a birchland marsh which is very cool and humid. *Vertigo moulinsiana* is described as a species of humid habitats, usually in marshes. Two habitats are given: a 'birch marshland' with more or less permanent water with open woodland (mainly *Betula pubescens*, some *Salix*) and an oak-elm-ash gallery forest. The presence of the marsh species here is attributed to standing water and open vegetation.

Ireland Vulnerable

Vertigo moulinsiana is locally distributed in the central lowlands. The distribution map by Kerney (1976; in press) and data given in Ross (1986) show that there are no post-1950 records for ten of the 28 10km squares from which it has been recorded, giving a decline of 40% by 1950. The remaining sites contain populations in both calcareous fens and along rivers such as the Barrow and the Shannon (M. Speight, *in litt*, 1992). The new sites along the Shannon led Martin Speight of the Irish Wildlife Survey to suggest that *Vertigo moulinsiana* should be removed from the threatened category. No data have been submitted by Martin Speight or the Irish Wildlife survey to the Red Data Book compilation on any species.

Italy Insufficiently known

Most older records are from the north: south Tirol (Ehrmann, 1933), provinces of Alessandria, Aosta and Novarra (Bishop, 1980), and Palazzi (1983) records it from Modena but notes that it had not been seen for 10 years. He comments that the habitats at Emilia-Romagna (listed with mountain litter species - a highly suspect association) are not ideal for the species and it is possible that these may in fact be of a different species (Palazzi, *in litt.* 4/1996). Palazzi also reports that some work has been commissioned over the last year on this species but little new information has come from this, and many of the suitable areas of habitat have disappeared.

Vertigo moulinsiana is also recorded from Sicily and Sardinia (Alzona, 1971). Status uncertain.

Luxembourg Extinct?

Adam (1960) records it as no longer found. Comments are awaited on any recent survey work but none is known at present.

Morocco Status unknown

The majority of molluscan records are for larger species, and smaller species are undoubtedly under-recorded. *Vertigo moulinsiana* is certainly present at a site near Larache, northwest Morocco (Seddon & Holyoak, 1993).

Netherlands Endangered (Bla,b,d)

Vertigo moulinsiana is currently known from three populations along the brook Geleen in the province of Limburg in the south-east part of the country (Ripken, *in litt.* 4/1996). The published rediscovery of this species at site near Noensbroek in Limburg (Ripken, 1982) was cited by Killeen (1996). Ripken describes the species as fairly common at these sites along the brook living 30-100 cm above the water on *Carex* and *Glyceria* species in relatively un-calcareous marshes.

Details of extinct sites in the area are given by Butot & Neuteboom (1958). The distribution is mapped by Gittenberger, Backhuys & Ripken (1984).

The species was recommended for legal protection 10. viii. 1984 by Natuurbeschermingsraad. However, is it not currently protected by the Nature Conservation Act Vervogblad 1 (Killeen, 1996). No recent work on the status of this species is known (Ripken, *in litt.*, 4/1996).

Poland Endangered (Bla_1b,d)

Vertigo moulinsiana was previously known from scattered localities, mainly in the east, with areas around Rajdrodzkie Lake (last recorded 1939), Lubniewice Lake Region, near Gorzow Wielpolski (last recorded 1986), Warsaw region at Dziekanow Lesney (last recorded 1957), Kacperek (last recorded 1924), and Trojanjow near Garwolin (last recorded 1937). Pokryszko (1987) commented that the most obvious explanation for the decline of this species lies in the fact that it is limited to swamps of *Glyceria aquatica* in Poland; these habitats have been subject to both mowing and drainage. In these areas, the species is found on *Typha, Iris, Glyceria, Carex* and *Phragmites.* Pokryskzo (*in litt.*) observes that the species is commonly found 30-50 cm above the watertable during the spring and summer period, feeding mainly on fungi. Pokryszko (*in litt.*, 4/1996) is aware of only two areas where it was recently recorded and where the habitat still exists (Bialowieza (2 sites) and Lubniewice). At these sites, the populations were very local (a few metres square) but the snails were abundant in these areas. In the main sites near Warsaw, the habitats have changed; only in one area does suitable habitat exist and there the species has not been re-found despite surveys. Details of all previous records plus a distribution map and ecology in Poland are given by Pokryszko (1990).

Portugal Not recorded (Albuquerque de Matos, 1993; *in litt.* 1996)

Slovakia Vulnerable Bib, d (IUCN, 1996)

Vertigo moulinsiana is locally distributed in relic calcareous swamps and fens mainly in the southern regions of Slovakia (Steffek, 1994 [?]; *in litt*, 8/1995). Fifteen sites are listed in Lisicky (1991), some of which have not been reassessed since 1956/1974. Recent records (post-1985) come from 50% of the sites. The species is not protected.

Spain Insufficiently known in the south of Spain but certainly endangered in the North

A distribution map is given by Rosas *et al.* (1994). In the literature, *Vertigo moulinsiana* is recorded from Lerida and a single site in Tarragona provinces in the north (Bech Taberner, 1979, 1990; Bech Taberner & Fernandez, 1987). Old records from the early parts of this century come from near Barcelona and along the Ebro in north-eastern Catalonia (Haas, 1929; Boettger, 1936). *Vertigo moulinsiana* was formerly present in central Spain (north-east of Madrid) during the Post-glacial (Preece, 1991) but there are insufficient data to comment whether this indicates a previously extensive distribution.

Recent survey work on the Fauna Iberica project (1990 onwards) has resulted in abundant data on invertebrate distributions but much is yet to be published. Comments from Benjamin Gomez

(*in litt.*, 4/1996) confirm that grant-aided work in the last year examining habitats for this species located it at two new sites, one in Catalonian and the other in East Huesca (Aragon). This team also surveyed other localities where *V. moulinsiana* had been previously recorded but did not find it. Both new sites were vegetated margins of little lakes that maintain a nearly constant level of water throughout the year. *Vertigo moulinsiana* was associated with *Cladium mariscus* (L.). Although the habitat at the margins of the two lakes is not extensive, the population density was high, with more than 500 specimen per square metre.

This species has been placed on national list of protected invertebrates (Rosas *et al.*, 1994).

Sweden Endangered

The first finding was made by Hans Lohmander on 22 September 1959 in southernmost Sweden (Lake Yddingen in the province Skania / Scania) and was thereafter not seen until Gardenfors re-discovered it at the same locality on 15 August 1988. There has not been any particular survey for the species in Sweden but in general the snail fauna is very well known, thus it is likely to be restricted to the one locality (Gardenfors *et al.*, 1988). Here it lives in a very restricted area of marsh (less than 1 ha) with *Iris pseudacorus, Phragmites australis* and *Eupatorium cannabinum,* surrounded by alder *Alnus glutinosa.* It is neither rare or abundant. The main threats could be summarised as infilling, hydrological changes and eutrophication (Andersson *et al.*, 1987). Findings of subfossil specimens at several localities (provinces of Skane and Gotland) indicate that the species used to be much more widely distributed in Sweden. As the Swedish landscape has been subject to drainage programmes during the last century, the inference is that several localities for the species have been destroyed. Although the species is on the national list of protected invertebrates (Andersson *et al.*, 1987), it has no legal protection. The only current Swedish locality is not protected but the authorities are aware of it and the site is not under any immediate threat (Gardenfors, *in litt.*).

Switzerland Conservation Dependant

Formerly *Vertigo moulinsiana* was locally distributed throughout the country. Mermod (1930) gives records for 19 localities (1855-1927) within the cantons of Geneva (8 sites), Vaud (4), Vallais (5), Berne (1) and Argovie (1). Recent data on habitat and status are given by Turner (1990), Ruetschi (1992) and Turner, Wuthrich & Ruetschi (1994). It has been recorded at 12 sites over the last five years (1991-1995). Six of these sites are now protected habitats under a Swiss protection programme for wetlands. The principal good sites are located on the margins of Lake Geneva and Lake Neufchatel. Habitats are the 'grassland' areas at the edge of lakes and rivers. Distribution details are available from Ruetschi (pers. comm., 3/1996), and a new atlas of Molluscan distributions should be published in the next year.

Turkey Status unknown

There is little distributional data; *Vertigo moulinsiana* was recorded from the northwest by Schutt (1994).

United Kingdom Conservation Dependant

The distribution is given by Kerney (1976) and recent records are to be added to this. *Vertigo moulinsiana* is locally distributed across southern and eastern England. There are populations in the Norfolk Broads (Bratton, 1991), Suffolk (Killeen, 1992) and in the south where recent recording has revealed previously unknown colonies in Hampshire, Berkshire, Wiltshire and Oxfordshire (Drake pers. comm., Kerney pers. comm., Killeen pers. comm. & personal observation). Killeen (1996) comments that the species has disappeared from many sites this

century due to wetland drainage but its overall decline was attributed to lowering of temperatures. Most sites are at some risk from drainage or borehole extraction.

In the United Kingdom, *Vertigo moulinsiana* occurs in long-established swamps, fens and marshes usually bordering rivers and lakes. It lives on both living and dead stems and leaves of tall plants: grasses (eg *Glyceria maxima*), sedges such as *Carex riparia* and *Cladium mariscus*, and reeds (eg *Phragmites australis*) (Kerney & Cameron 1979; Bratton 1991; Killeen 1992). The species shows a preference for life on taller vegetation upon which it ascends during the summer season, and is rarely found in litter.

In Berkshire, *Vertigo moulinsiana* re-colonised after the last Ice age around 9600 years BP, when the birch woodland was being replaced with pine, hazel and birch woodland. Holyoak (1983) suggests that the arrival of *Vertigo moulinsiana* was indicative of development or persistence of reedswamp/fen habitats.

Vertigo moulinsiana is listed in the Red Data Book (Bratton, 1991) and many of the sites are designated as Sites of Special Scientific Interest (SSSIs).

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