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

Fourth Report by the United Kingdom under Article 17

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

Supporting documentation for the
conservation status assessment for the species:

S1016 - Desmoulin's whorl snail (*Vertigo moulinsiana*)

ENGLAND

IMPORTANT NOTE - PLEASE READ

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

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

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (England information only)**
1.2 Species code	**1016**
1.3 Species scientific name	**Vertigo moulinsiana**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Desmoulin's whorl snail

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2013-2018
2.3 Distribution map	Yes
2.4 Distribution map Method used	Complete survey or a statistically robust estimate
2.5 Additional maps	No

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

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

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

a) Unit

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

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

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

Abrehart T.R. 2014. Annex A: SAC status reporting on Vertigo moulinsiana in Norfolk and Sufolk 2014. An ecological survey including vegetation and invertebrates observations undertaken for Natural England by Abrehart Ecology.
Abrehart T.R. (2013). Baseline data for the population size and distribution of Vertigo moulinsiana (Desmoulin's Whorl Snail) at Aqualate Mere NNR, Staffordshire. March 2013. An ecological survey including floral and fauna observations undertaken for Natural England by Abrehart Ecology.
MJ Willing (2015) SAC Status reporting on Vertigo moulinsiana in England: monitoring at selected sites on the Hampshire / Wiltshire River Avon and tributary rivers Wylye and Bourne. Report to Natural England.
Abrehart T.R. 2014. Annex A: SAC status reporting on Vertigo moulinsiana in Norfolk and Sufolk 2014. An ecological survey including vegetation and invertebrates observations undertaken for Natural England by Abrehart Ecology.
Killeen. IJ. 2015. SAC Status reporting on Vertigo moulinsiana in England: monitoring at selected sites on the Hampshire / Wiltshire River Avon and tributary rivers Wylye and Bourne. Report to Natural England
Abrehart T.R. 2014. Annex A: SAC status reporting on Vertigo moulinsiana at Westbere Marshes, Kent 2014. An ecological survey including vegetation and invertebrates observations undertaken for Natural England by Abrehart Ecology.
Abrehart T. R. 2015. Baseline survey for population size and distribution of Vertigo
moulinsiana (Desmoulin's Whorl Snail) at Fenemere SSSI, Shropshire, 2014.
Abrehart T.R. (2012). Baseline data for the population size and distribution of Vertigo moulinsiana (Desmoulin's Whorl Snail) at Quoisley Mere, Cheshire SSSI. October 2012. An ecological survey including floral and fauna observations

undertaken for Natural England by Abrehart Ecology.
Abrehart T. R. 2015. Investigation into the abundance and distribution of Desmoulin's Whorl Snail
Vertigo moulinsiana Chapel Mere SSSI, Cholmondeley Estate, Cheshire, 2015.
MJ Willing . 2016. New Vertigo moulinsiana finds south of Amesbury (extracts from survey report undertaken for Atkins as part of work undertaken for the Highways Agency in relation to the A303 Stonehenge Tunnel proposals).
Improvement Programme for England's Natura 2000 Sites (IPENS) Site Improvement Plan: Waveney and Little Ouse Valley Fens. Natural England, 2015.
Abrehart Ecology 2017. Desmoulin's Whorl Snail (Vertigo moulinsiana) Article 17 Condition Assessment of River Wensum SAC for Natural England by Abrehart Ecology 2017
Kerney, M. P. Atlas of the non-marine mollusca of the british isles, 1976, NERC, ITE.
Bratton J.H (ed) British Red Data Books.3. Invertebrates other than insects. JNCC. 1991.
Improvement Programme for England's Natura 2000 Sites (IPENS) Site Improvement Plan: The Broads. Natural England, 2014
Jones, R. Denham Lock Wood: preliminary invertebrate survey. Richard A. Jones 2017, London Wildlife Trust.

5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Decreasing (-)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	Genuine change Improved knowledge/more accurate data The change is mainly due to:	Genuine change
5.12 Additional information	With now only some 4 small sites on the Hampshire Avon, and the loss of the populations on the lower reaches of the River Wensum there has been a significant thinning within the English range. Whilst this has been partly offset by the discovery of new location, such as the populations at Aqualate Mere NNR, the general trend remains one of decrease in fluvial sites, and some degree of stability in the offline wetlands.	

6. Population

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6.1 Year or period	2013-2018	
6.2 Population size (in reporting unit)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	42
	c) Maximum	52
	d) Best single value	50
6.3 Type of estimate	Best estimate	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of map 10x10 km grid cells (grids10x10)
	b) Minimum	20
	c) Maximum	30
	d) Best single value	30
6.5 Type of estimate	Best estimate	
6.6 Population size Method used	Based mainly on extrapolation from a limited amount of data	
6.7 Short-term trend Period	2007-2018	
6.8 Short-term trend Direction	Decreasing (-)	
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.10 Short-term trend Method used	Complete survey or a statistically robust estimate	
6.11 Long-term trend Period	1995-2018	
6.12 Long-term trend Direction	Decreasing (-)	
6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.14 Long-term trend Method used	Complete survey or a statistically robust estimate	
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size b) Operator c) Unknown d) Method	
6.16 Change and reason for change in population size	Genuine change Improved knowledge/more accurate data	
	The change is mainly due to:	Genuine change
6.17 Additional information		

7. Habitat for the species

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7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	No
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	No
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on extrapolation from a limited amount of data	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Decreasing (-)	
7.5 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data	
7.6 Long-term trend Period	1995-2018	
7.7 Long-term trend Direction	Decreasing (-)	
7.8 Long-term trend Method used	Based mainly on extrapolation from a limited amount of data	
7.9 Additional information		

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	M
Abstraction from groundwater, surface water or mixed water (K01)	H
Mowing or cutting of grasslands (A08)	M
Droughts and decreases in precipitation due to climate change (N02)	H
Increases or changes in precipitation due to climate change (N03)	H

Threat	Ranking
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	M
Abstraction from groundwater, surface water or mixed water (K01)	H
Mowing or cutting of grasslands (A08)	M
Droughts and decreases in precipitation due to climate change (N02)	H
Increases or changes in precipitation due to climate change (N03)	H

8.2 Sources of information	
8.3 Additional information	Abstractions are regulated and were subject to a review of Consents around the SAC series, though the drying trend which these riverine systems have experienced over the last few years seemed to have dropped water levels of the adjacent and marginal fens to levels that compromise the snail. In this respect, low rainfall is more of a threat than abstraction at the moment The

biggest losses seems to concentrate on riverine systems as opposed to those populations on more isolated fens, marshes and the marginal vegetation of meres. This is not so much a water quality as probably a water quantity factor, leaving the adjacent fens drier than is required for this hydrophilic species. This is, of late, probably a reduction in precipitation issue rather than abstraction, though a review perhaps is needed to re-balance the decisions on abstraction.
Subtle drops and width reduction in the wetted margin are a significant threat. Flooding of the wetted margin is also a threat.

9. Conservation measures

9.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified, but none yet taken
9.2 Main purpose of the measures taken		Restore the habitat of the species (related to 'Habitat for the species')
9.3 Location of the measures taken		Both inside and outside Natura 2000
9.4 Response to the measures		Long-term results (after 2030)

9.5 List of main conservation measures

- Stop mowing, grazing and other equivalent agricultural activities (CA06)
- Restore habitats impacted by multi-purpose hydrological changes (CJ03)
- Manage water abstraction for public supply and for industrial and commercial use (CF11)
- Adopt climate change mitigation measures (CN01)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters

a) Range
b) Population
c) Habitat of the species

10.2 Additional information

Given how subtle the extent of the wetted marginal zone is, a lot will depend on water management in the face of changing rainfall patterns, flood issues, and the continuing breaking on riverine systems of recolonisation opportunities. The position may be improved by re-establishment of populations on rivers where it has been lost.

11. Conclusions

11.1. Range

11.2. Population

11.3. Habitat for the species

11.4. Future prospects

11.5 Overall assessment of Conservation Status

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11.6 Overall trend in Conservation Status	
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	

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

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	26
12.2 Type of estimate	Best estimate	
12.3 Population size inside the network Method used	Complete survey or a statistically robust estimate	
12.4 Short-term trend of population size within the network Direction	Decreasing (-)	
12.5 Short-term trend of population size within the network Method used	Complete survey or a statistically robust estimate	
12.6 Additional information	The overall trend within the SAC series is one of decline. The audit note details this assessment.	

13. Complementary information

13.1 Justification of % thresholds for trends
13.2 Trans-boundary assessment
13.3 Other relevant Information

Distribution Map

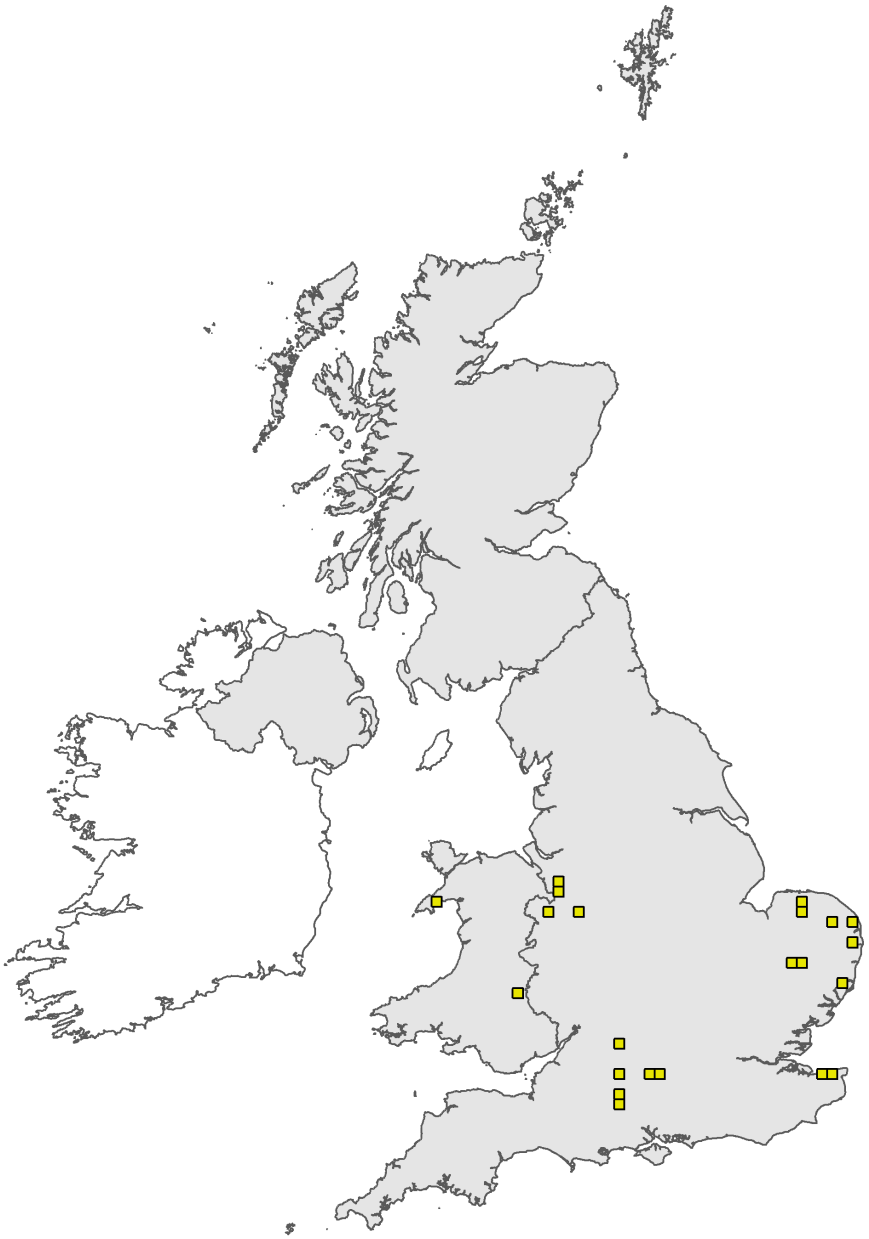

Figure 1: UK distribution map for S1016 - Desmoulin's whorl snail (*Vertigo moulinsiana*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

Range Map

Figure 2: UK range map for S1016 - Desmoulin's whorl snail (*Vertigo moulinsiana*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

Explanatory Notes

Species name: Vertigo moulinsiana (1016) Region code: ATL

Field label	Note
6.2 Population size	Notwithstanding the reduced survey effort undertaken for the 4th report (so the River Frome, for example, was not able to be surveyed), there is a real decline happening underneath the fall in both monads and hectads reported here.
6.2 Population size	The monad count follows the same estimation process described for the hectads, though takes one monad per hectad as its estimated extension, tempered by the direct counts that were possible for the report. 50 monads seems a reasonable estimation, based on what was surveyed, what was not but is considered a stable habitat, what was known to be lost, and what might be lost.
6.4 Additional population size	The reduced survey effort in the 4th period over distorts the distributional picture, and a degree of constancy can be attached to some of the previously surveyed sites as they follow the general rule of not being river-dependent. The 6 hectads of the Shropshire, Cheshire and Staffordshire meres are stable, and the Fenemere survey is indicative of that persistence. In addition, the 3 hectads of the River Frome ditches and the Wareham meadows SSSI are similarly considered to be relatively secure. A single hectad and monad is ascribed to Sawbridgeworth Marsh SAC, as this is well managed, and an offline wetland. Jones (2017) reports not finding the snail at the Denham Woods reserve. This all raises the indicative hectad count maximum to 30, so 10 below the 3rd report 40 hectad level. This may be slightly high, but this estimate does give a better baseline. Given the nature of the losses on riverine systems, this estimation technique has not been applied to this habitat type, as on the Frome, for example.
6.10 Short term trend; Method used	This species was subjec to targetted survey across the main SSSI/ SAC and wider countryside sites within which it was recorded as occuring in the recent past. Whilst surveyors were instructed to have a minimum sampling effort, this was countered by a requirement to well cover the area, so no upper limit was placed on effort. On the large riverine sites, representative areas were surveyed, often based on previous survey effort. Population classes were used rather than counts, but these have not been used, though have been retained for a rough assessment of the sample data and the numbers of samples taken with no snails, and this with bigger, or smaller numer of animals, as a rough gauge of population fitness across the range in England. There has been no methodological difference in survey technique between the 3rd and 4th reports.
6.12 Long term trend; Direction	Going right back, from the 1950s to the mid 1970s, moulinisana was recorded unsystematically, in 29 10km squares (Kerney, 1976). Nevertheless it seems to have been regarded as scattered but widespread species, with the Broad having the bulk of the population (Bratton, 1991). As the 1950-1976 position of distribution is known to have been an underestimate, it is of concern that the current distribution is considered to have reduced to this hectad level, despite being higher based on increased survey effort arising from the IPENS programme. The 3rd report noted Overall, the picture for this species has not been good, having declined from 278 one km sqs in the period 1989-2012, down to 123 one km sqs from 2001-2012, a loss of 155 one km sqs. The current position see the species in fewer sites, though some of this is from reduced sampling effort, but the trend down does, nonetheless, continue, as the narrow riparian wetted margin continues to have either too much or too little water at the key times.

6.12 Long term trend; Direction	The long term trend direction remains one of losses and population thinning where still present. There continue to be population discoveries, such as the further populations at Aqualate Mere NNR in Staffordshire (Abrehart, 2013) and the continued population presence at Fenemere SSSI, Shropshire (Abrehart, 2014) with these, as is typical of static water sites, strong and robust. However, set against, this is the 86% decline on the Hampshire Avon SAC and tributaries (Willing, 2015), and the species retreat to the upper reaches of the River Wensum (Abrehart, 2017), and the unfavourable bad assessment for the Thatcham reedbed component of the Kennet & Avon SAC (Killeen, 2015), the trend is of decline.This 4th report underplays the current distribution (so the 20 hectads is shown as a minimum), but it is considered lower than that reported in the 3rd report (40 hectads), or the 2nd report (68 hectads). An estimation of 30 hectads is suggested for the 4th report.
7.1 Sufficiency of area and quality of occupied habitat	40km square is an estimate of the area of rich tall fen, as taken from the UKBAP assessment (per comm NE's fen specialist). This is likely to be an over-estimate of the actual narrow habitat niche actually used. The decline, which is hard to quantifiy, is based on a decline in condition (=mostly drying out) rather than actual loss of the habitat. The riparian fringe is much harder to estimate. The 3rd A17 report figure
7.5 Short term trend; Method used	1-5 ground wetness scale used; noting of principal vegetation components in areas sampled.
7.7 Long term trend; Direction	Pretty much founded on a climate change scenario of either locked in periods of low rainfall, or conversely floods. The situation might be ameliorated by the develoopment of natural process wetlands, such as that currently being proposed on the River Avon, which might yield a much greater number of hydrological options for this species than the fairly simplistic riparian fringe it has ended up with.
7.8 Long term trend; Method used	Method founded on the SAC selection survey work results, and the mapped extent of moulinisiana at that time; before that this relatively common species had little survey interest from the conchological community.
7.9 Additional information	As noted in the 3rd report, the relatively narrow riparian fringe used by Desmoulins snail on river systems is hard to calculate, and will be a fraction of the bounding polygon on either side of the river corridor. This narrowness is part of the reason, probably, for the decline in riverine systems; the larger areas found in, for example, the shallowly sloping mere edges of the Midland sites give a much greater habitat zone the species can use.
8.1 Characterisation of pressures/ threats	Being an effectively a semi-amphibious species, liking it neither too dry or too wet, it does suffer from the lack of natural processes on riverine sites, and is impacted throughout by lowered or elevated water levels. Exploring some of the water monitoring data it seems not to currently be able to track this wetted margin in enough detail and at a fine enough scale to stop losses or make adjustments to abstractions etc.
9.1 Status of measures	Beyond the Review of Consents on water abstractions, and some localised assessments on some sites hydrology, the larger scale and necessary wetland natural process restoration is still mostly absent, though is starting to form.
9.5 List of main conservation measures	Re-storation of ecosystem processes is being undertaken, and this might help re-create more natural systems within which moulinsina can thrive, as lowland constrained rivers are now unsuitable for it.
9.6 Additional information	The Review of Consents will have dealt with river levels at the time, but it is clear that rainfall pattern changes have resulted in enough subtle declines in the amount of wetted margin that many populations will have faltered and declined. Having often broken the upstream population resource , the opportunities for re-colonisation then become slight. This decline in wetted margin seems particularly hard to demonstrate as the river level data is more concerned with in-channel, rather than riparian wetted margin, quality.

12.1 Population size inside the pSCIs, SCIs and SACs network	The intersection with SAC includes those selected for the species and those where it is present but not a primary feature. Despite matching the 3rd report monad counts, the population neverthless is showing fairly constant thinning, though whether this thinning will continue as a future trend is unclear,as it has a strong dependency on climate change here and rainfall patterns. The losses noted in the 3rd report remain as losses.
12.4 Short term trend of the population size within the network; Direction	The following are abstracts from the relevant surveys: The condition assessment of the Thatcham Reedbeds component of the Kennet & Lambourn SAC can be determined by how well the site meets the key targets for the attributes associated with this species. Population was assessed as Favourable Declining, Habitat as Unfavourable Declining and Future Prospects as as Unfavourable Bad. Therefore, the overall assessment is Unfavourable Bad. the overall trend of localized contractions and disappearances, and very significant decreases in abundance particularly in the north-west and south-east of the site has continued since the last 2012 assessment. The localised extinctions within the other parts of the Kennet & Lambourn SAC as noted in the 3rd report, of course, remain lost. Wensum: This survey has shown that all the sites where Vertigo moulinsiana was found were away from the main river channel of the River Wensum. Where suitable habitat existed away from the rivers influence the numbers of animals increased. This is rather telling. The SAC itself seems to support a very low density of V. moulinsiana within the margins of the river. Only one juvenile V. moulinsiana was found during this survey. (Abrehart,2017). In the previous Article 17 survey in 2011 (Abrehart 2011) of Hellesdon and Great Witchingham Common found no V. moulinsiana in the vegetation on the river banks, there were only specimens found away from the river in adjacent non-directly connected well vegetated ditches. This seems to show that there may be an influence within the river that is affecting the V. moulinsiana population within the river system. The populations were at their highest density further away from the rivers influence. This indicates that the marshes and ditches within the floodplain as opposed to the river margins themselves. River Avon: Whilst 5 small populations have been discovered on the Avon, this does little to offset the massive decline on this system, with the 2014 survey noting the loss of 3 sites since the 2010 survey. Willing (2014) estimates an 86% decline of Vertigo moulinisiana populations across the River Avon catchment. The Broads SAC: The 6 sites noted in 2010 are still extant, although only 1 was entirely Favourable, with future prospects of decline apparent in one other, and Unfavourable for the remaining 3 surveyed. Waveney and Litle Ouse Valley Fens SAC. Market Weston fen is Favourable for this species..
12.6 Additional information	Thatcham reedbeds (as part of the Kennet and Lambourn SAC) was judged as Unfavourable Bad for the whole assessment; Westbere marshes are assessed as Unfavourable, the River Avon, having suffered some 86% decline, is clearly Unfavourable, and the River Wensum is Unfavourable. Within the Broads SAC, Crostwick marsh was Favourable, as was Burgh Common and Muckleet Marshes SSSI; the Waveney and Little Ouse Valley Fens SAC , Weston Fen is Favourable, whilst the more riparian sites at Fritton and Euston Estae, are generally Unfavourable. The observation made in the 3rd report still holds true: These changes were consistent with a reduction in water tables and a general drying out of riverine sites, but although hydrological explanations appeared to explain several of the recorded crashes in V. moulinsiana populations, there were still some observations that did not appear to be consistent with such explanation, so other factors may also be involved. In contrast, many of the more isolated fen sites seem to have fared better. In crude area terms, there is 8 x more unfavourable SAC than favourable for this species, though the actual habitat areas used on riverine systems are a fraction of the reported area of the site.