MONITORING OF SITES AND HABITAT FOR THREE ANNEX II SPECIES OF WHORL SNAIL (VERTIGO) (IWM 104).

APPENDIX VI. VERTIGO MOULINSIANA SITE REPORTS

John T. Brophy and Maria P. Long
National Parks and Wildlife Service (NPWS) commissions a range of reports from external contractors to provide scientific evidence and advice to assist it in its duties. The Irish Wildlife Manuals series serves as a record of work carried out or commissioned by NPWS, and is one means by which it disseminates scientific information. Others include scientific publications in peer reviewed journals. The views and recommendations presented in this report are not necessarily those of NPWS and should, therefore, not be attributed to NPWS.
Monitoring of sites and habitat for three Annex II species of whorl snail (*Vertigo*) (IWM 104). Appendix VI. *Vertigo moulinisiana* site reports

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Keywords: *Vertigo moulinisiana*, Article 17, monitoring


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ISSN 1393 – 6670
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VmCAM09 Waterstown Lough
VmCAM10 Ballynafagh Bog
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Appendix VI *Vertigo moulinsiana* site reports

**Introduction**

This Appendix to the main report on the *Vertigo* habitat and site monitoring project contains the individual reports for *Vertigo moulinsiana* sites. These have been generated from the Microsoft Access database as part of the Vertigo National Monitoring Project. Each site report provides the results from the current monitoring survey (2014-2017) and the previous monitoring survey (2008-2010). These reports should be read in conjunction with the main report. Note that the correction of errors or omissions from the data relating to the previous monitoring period was not part of the current project and so may still be present within the site reports.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM01  County: Carlow
SAC Site Code: 002162  River Barrow and River Nore

Location description (from baseline survey):

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<th>Recorders</th>
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<td>10 Nov 2014</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>21 October 2008</td>
<td>Evelyn Moorkens &amp; Ian Killeen</td>
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1.2 General Habitat Description (from baseline survey):

The general habitat in which Vertigo moulinsiana is present at Borris Bridge is a low lying area of swamp fen. The EU habitats that this relates to are water fringe vegetation comprising medium-tall waterside communities (CORINE 53.14) and reed sweetgrass beds (CORINE 53.16) with some rich fen characteristics (CORINE 54.2, Annex I 7230) (Romão, 1996; Devillers et al., 1991). The snail is found typically on Glyceria maxima in association with Equisetum fluviatile, Filipendula ulmaria, Iris pseudacorus, and Phragmites australis. The water table was above ground surface level in places. The specific areas that are within a wider mosaic, but that form specific V. moulinsiana habitat fit the Filipendula mire of the M27 Rodwell characteristic vegetation classification (Rodwell, 1991). This falls within the more general habitat of rich fen and flush (PF1), reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossett (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Glyceria maxima, Phalaris arundinacea, Equisetum fluviatile
Class II: Berula erecta, Epilobium hirsutum
Class III: Iris pseudacorus, Urtica dioica
Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

This is a small site, but the habitat appears to be in good condition and potentially suitable for Vertigo moulinsiana. However, the species was not found in spite of 31 samples taken at nine locations in 2014. Moorkens & Killeen (2011) noted low numbers for the species at the site in two previous surveys (2006 and 2008). It is not clear whether this site may always have harboured a small population, in low and difficult-to-detect numbers, or whether the species is lost, or nearly so, from the site. The site is likely to be subject to occasional flooding from the adjacent River Barrow, and perhaps this regime has altered, causing the loss/decline of the species. Only careful and dedicated monitoring will help elucidate this. No active management is recommended at this time for the site, but scrub encroachment is a potential issue and may need action by the time of the next monitoring (two years’ time).

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<tr>
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<td>End of marginal fen &amp; swamp before the start of the woodland</td>
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4. RESULTS
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<th>Habitat suitability</th>
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### Polygon habitat characteristics

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<td>Polygon A status has been upgraded from Suboptimal to Optimal-Suboptimal due to it appearing to be wetter underfoot in 2014, and therefore more suitable for Vertigo moulinsiana. The habitat consists of a swamp with tall-growing species such as Glyceria maxima, Phalaris arundinacea and Iris pseudacorus.</td>
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**Monitoring Period: 2007-2012**

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**Tuesday, October 24, 2017**

Page 2 of 8
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### Spot Samples

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</table>
Vertigo moulinsiana monitoring at Borris

5. CONDITION ASSESSMENT

5.1 Population Assessment:  2 passes Favourable (green); 1 pass Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
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</table>

2013-2018  1  Density  50% of the samples contain at least 5 adult snails from at least 20 samples  0% of the samples contain any snails, from 21 samples  Fail
Vertigo moulinsiana monitoring at Borris

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>90% of samples in the Transect are dominated by suitable vegetation (Classes I &amp; II), from at least 20 samples</td>
<td>85% of samples in the Transect are dominated by suitable vegetation (Classes I &amp; II), from 21 samples. (Expert judgement rounded to allow pass)</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat quality</td>
<td>90% of samples in the Transect fall within soil moisture classes 3-5, from at least 20 samples</td>
<td>100% of samples in the Transect fall within soil moisture classes 3-5, from 21 samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat extent</td>
<td>90% of samples in the Transect is dominated by suitable vegetation (Classes I &amp; II), from at least 20 samples</td>
<td>22 samples suitable (100%)</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat quality</td>
<td>90% of samples in the Transect fall within soil moisture classes 3-5, from at least 20 samples</td>
<td>22 samples suitable (100%)</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2.2 Site level

<table>
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<th>Mon. period</th>
<th>Indicator</th>
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<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>1ha of the site optimal or with sub-optimal areas</td>
<td>1.15ha Optimal-Suboptimal</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>1ha of the site optimal or with sub-optimal areas</td>
<td>1.13 ha Sub-optimal</td>
<td>Pass</td>
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5.3 Future Prospects Assessment

<table>
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<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>I01</td>
<td>invasive non-native species</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>2%</td>
<td>Informed by NPWS DCO that Impatiens glandulifera removal has occurred at the site</td>
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Vertigo moulinsiana monitoring at Borris

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Red</td>
<td>Green</td>
<td>Amber</td>
<td>Red</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Amber</td>
<td>Green</td>
<td>Amber</td>
<td>Amber</td>
</tr>
</tbody>
</table>

2013-2018 - Based on the field survey, succession by scrubbing over is one of the main impacts that was identified that may threaten the Future Prospects of the site as being suitable for Vertigo moulinsiana. It may be the case however, that periodic flooding from the nearby river keeps scrub under control. Data are not available on teh flooding regime, but it is likely that the site floods periodically, and changes in this regime may be having an impact. The highly invasive Impatiens glandulifera is known to occur at the site. Due to the fact that the target species was not recorded, the Future Prospects have been retained as being Unfavourable Inadequate (amber).

2007-2012 - Although these impacts are potential rather than actual, given the small size and vulnerability of the site, Future prospects have been assessed as Unfavourable inadequate.

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: As in 2007-2012, the habitat that supports Vertigo moulinsiana within this SAC lies downstream of Borris Bridge and comprises a strip of fen and swamp less than 0.5 ha in area.

Discussion:
This is a small site, but the habitat appears to be in good condition and potentially suitable for Vertigo moulinsiana. However, the species was not found in spite of 31 samples taken at nine locations in 2014. Moorkens & Killeen (2011) noted low numbers for the species at the site in two previous surveys (2006 and 2008). It is not clear whether this site may always have harboured a small population, in low and difficult-to-detect numbers, or whether the species is lost, or nearly so, from the site. The site is likely to be subject to occasional flooding from the adjacent River Barrow, and perhaps this regime has altered, causing the loss/decline of the species. Only careful and dedicated monitoring will help elucidate this. No active management is recommended at this time for the site, but scrub encroachment is a potential issue and may need action by the time of the next monitoring (two years’ time).

Monitoring recommendations: The overall assessment for this site has dropped to Unfavourable Bad (red) due to the failure to find Vertigo moulinsiana in 2014. In light of this, 2 yearly monitoring should be carried out following the recommendations of Moorkens & Killeen (2011):

- Repeat Transect 1. In field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Take 5 samples at each from at least 2 other locations with optimal habitat (e.g. sites 10 and 11 from the 2008 survey), record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations: The site is not actively managed and no grazing is occurring. While some succession is occurring in the form of scrub, grazing should
Vertigo moulinsiana monitoring at Borris

not be introduced as it could negatively impact on the vegetation required by the snail. The ecology of the site is controlled by groundwater, surface water run-off from higher ground and occasional flooding of the River Barrow. At this time, no management intervention is recommended, though future removal of scrub may be necessary (carefully planned removal by hand, not machine) and this should be monitored closely as part of the ongoing monitoring of the site.

2007-2012

**Area of occupancy:** The habitat that supports Vertigo moulinsiana within this SAC lies downstream of Borris Bridge and comprises a strip of fen and swamp less than 0.5ha in area.

**Discussion:**
The Condition of the site and the feature based upon the 2008 survey has been assessed as unfavourable inadequate due principally to the low rate of occurrence and low numbers of V. moulinsiana.

Comparison with the results obtained in 2006 (Table 1 and Appendix), the 2008 results gave higher numbers of Vertigo moulinsiana, particularly adult individuals, but the actual numbers are still extremely low. However, the population assessment improved from red to amber. The area of potential habitat is a little over 1 hectare but the area of occupancy (probably <300m²) is extremely small making the V. moulinsiana population particularly vulnerable to severe flood events and loss of habitat. Much of the area with potentially suitable habitat is currently too dry with dense Iris and Filipendula dominated fen. Scrub and woodland encroachment may also be becoming an issue; the aerial photograph used in Moorkens (2007e) (millennium edition) shows a more open habitat than that shown in Figure 1 of this report which utilizes a later aerial photograph. It is recommended that options for drain blocking or sluice introduction are assessed to see if this small habitat area can be kept at a suitable level of dampness and further succession delayed.

**Monitoring recommendations:**
Given the Unfavourable assessment of the Condition of the site, particularly in terms of Vertigo moulinsiana distribution and abundance, it is recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

**Frequency:** Next monitoring due 2011

**Methods** (see Section 4 of main report for full details). Prescription as follows:
- Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Take 5 samples at each from at least 2 other locations with optimal habitat (e.g. sites 10 and 11 from the 2008 survey), record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

**Management recommendations:**

**Existing Management**
The V. moulinsiana habitat at this site comprises a single management unit. There is currently no management within the site of the V. moulinsiana habitat.

**Proposed management prescription for Vertigo moulinsiana**
The Vertigo moulinsiana habitat is maintained by its high groundwater table and probably by occasional flooding from the River Barrow nearby. It is low lying with respect to the banks and path between the river and the swamp. Any grazing of the tall vegetation of the swamp would be likely to have a detrimental effect on the usefulness of the habitat for this species. The site is vulnerable to long term hydrogeological changes, and any water abstraction from the river that would result in a lowering of the groundwater table at any time of year. Any site that has no grazing management needs to be kept under surveillance to ensure succession is not taking place and the area is being maintained by wetness. It is useful to have a small site that is likely to only be affected by hydrogeology changes as it allows the assessment of changes over time of a single factor, although this factor can be influenced by a number of issues, such as abstraction and climate change.
Site report - Vertigo Monitoring
Vertigo moulinsiana monitoring at Fin Lough (Offaly)

1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM02 County: Offaly
SAC Site Code: 000576 Fin Lough (Offaly)

Location description (from baseline survey):

- Monitoring period: Date surveyed: Recorders
  - 2013-2018: 5-6 Nov 2014: John Brophy & Maria Long

1.2 General Habitat Description (from baseline survey):

The lake and its surrounding wetland communities are arranged in distinct zones across a hydrological transition. They include open water, reedswamp, tall sedge, alkaline fen, fen-bog transition, swamp woodland and bog. EU habitats present at Vertigo moulinsiana habitat are Alkaline fens: low sedge-rich communities (Annex I Habitat 7230), rich fens of CORINE 54.2 and fen-sedge beds of CORINE 53.3 (Romão, 1996; Devillers et al., 1991). Principal habitats at the site include water fringe vegetation: reedbeds and large sedge communities e.g. Glyceria maxima swamp, Carex elata swamp, Typha/Phragmites beds, most communities of Corine 53 (water-fringe vegetation), especially: common reed beds, dry Phragmites beds (53.112), reedmace beds (53.13), medium-tall waterside communities (53.14), reed sweetgrass beds (53.16), and large Carex beds (53.21). In transition areas of lower and more tightly cropped sward, the habitat falls into the Rodwell M10 Pinguiculo-Caricetum dioicae Caricion davallianae group, characteristically being distinguished by Carex viridula, C. panicea, Parnassia palustris, Campylium stellatum, Pinguicula vulgaris, Selaginella selaginoides, and Drepanocladus revolvens. These communities merge into one another with throughout the habitat. They fall within the more general habitat of rich fen and flush (PF1) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

**Class I:**
- Tall Carex species,
- Equisetum fluviatile,
- Typha angustifolia,
- Sparganium erectum

**Class II:**
- Phragmites australis, Schoenoplectus lacustris,
- Eriophorum angustifolium

**Class III:**
- Filipendula ulmaria, Epilobium hirsutum, Menyanthes trifoliata, Mentha aquatica, Schoenus nigricans

**Class IV:**
- All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

This site consists of an infilling lake, and so contains a wide variety of transitional habitats. It also has areas of calcareous fen with Schoenus along its northern shore. There are large areas of habitat suitable for Vertigo moulinsiana. The site continues to have habitat in good condition and shows good future prospects, but received an Unfavourable (Red) assessment for its population. Only approximately half of sample locations were positive for the target species in 2014, compared to three-quarters when Moorkens and Killeen last surveyed. The abundances were lower also. As the habitat appears to still be in good condition, it is hoped that these results are the result of weather or a poor breeding year for the species. Monitoring in three years’ time will be very important in terms of assessing whether the population is indeed declining.

3. TRANSECT DETAILS

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Vertigo moulinsiana monitoring at Fin Lough (Offaly)

4. RESULTS

Polygon habitat characteristics

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Tuesday, October 24, 2017
Vertigo moulinsiana monitoring at Fin Lough (Offaly)

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<td>44</td>
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<tr>
<td>2007-2012</td>
<td>10a</td>
<td>N 03517 29642</td>
<td>16</td>
<td>2</td>
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<tr>
<td>2007-2012</td>
<td>10b</td>
<td>N 03517 29642</td>
<td>1</td>
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<td>2007-2012</td>
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<td>2007-2012</td>
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<td>N 03376 29630</td>
<td>2</td>
<td>23</td>
<td>25</td>
<td>4</td>
</tr>
</tbody>
</table>

5. CONDITION ASSESSMENT

5.1 Population Assessment: 4 passes Favourable (green); 2-3 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)
Vertigo moulinsiana monitoring at Fin Lough (Offaly)

5.2 Habitat Assessment:

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Density</td>
<td>10 samples (from a minimum of 38) contain at least 20 adult and juvenile snails</td>
<td>3 samples (from 37) on transects contain at least 20 adult and juvenile snails</td>
<td>Fail</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 21 samples (= 75% of samples) on Transects T1, T3 and T4 combined (minimum 28 samples)</td>
<td>V. moulinsiana is present in 18 samples (= 67% of samples) on Transects T1, T3 and T4 combined (27 samples)</td>
<td>Fail</td>
</tr>
<tr>
<td>2013-2018</td>
<td>2</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 2 samples (excluding the start point) on Transect T2 (minimum 10 samples)</td>
<td>V. moulinsiana present in 1 sample on Transect T2 (10 samples)</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Density</td>
<td>10 samples (from a minimum of 38) contain at least 20 adult and juvenile snails</td>
<td>16 samples with 20 or more adults and juveniles</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 21 samples (= 75% of samples) on Transects T1, T3 and T4 combined (minimum 28 samples)</td>
<td>Present in 25 samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>2</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 2 samples (excluding the start point) on Transect T2 (minimum 10 samples)</td>
<td>Present in 3 samples</td>
<td>Pass</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Species extent</td>
<td>V. moulinsiana is present at 5 other locations (50% of those sampled from at least 10 locations) with a geographical spread of appropriate habitat</td>
<td>V. moulinsiana is present at 6 other locations (60% of those samples from 10 locations) with a geographical spread of appropriate habitat</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Species extent</td>
<td>V. moulinsiana is present at 5 other locations (50% of those sampled from at least 10 locations) with a geographical spread of appropriate habitat</td>
<td>Present at 11 other locations (100%)</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>At least 15ha of the site optimal with sub-optimal areas</td>
<td>17.22ha Optimal</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Population Notes:

Vertigo moulinsiana was found throughout the area surveyed at Fin Lough and in moderate numbers. In the current survey, 25 of 47 sample locations (53%) were positive, as compared to 38 of 50 sample locations (76%) in the 2007-2012 survey. Based on the abundance criteria of Moorkens & Killeen (2011), along with the decreased abundance of the species in positive samples, the population assessment is Unfavourable Bad (red).

In 2007-2012 the snail is widespread and locally abundant.

5.2.1 Transect level

3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)
5.3 Future Prospects Assessment

### Mon. period | Activity code | Activity description | Location | Intensity | Influence | Area affected | Comment
--- | --- | --- | --- | --- | --- | --- | ---
2013-2018 | A04.02.01 | non intensive cattle grazing | Inside | Medium | Negative | 3% | Some poaching

2013-2018 | H02.06 | diffuse groundwater pollution due to agricultural and forestry activities | Inside | Low | Negative | 2% | Enrichment evidenced by Ranunculus repens, etc. in Polygon A

2007-2012 | A04.02.01 | non intensive cattle grazing | Inside | Low | Neutral | 0.6ha | Cattle grazing at present is mainly outside the V. moulinsiana habitat, with minor areas within the habitat being poached.

2007-2012 | K02.01 | species composition change (succession) | Outside | Medium | Negative | 16.55ha | Long term succession to drier habitat due to influences (drainage, peat cutting) outside the site may have an increasing negative effect in the future. Thus if vegetational succession becomes evident in future monitoring, some remedial management may need to be recommended, such as drain blocking.

2007-2012 | M01.01 | temperature changes (e.g. rise of temperature & extremes) | Inside | Low | Negative | 16.55ha | The most likely issues which could potentially affect V. moulinsiana at Fin Lough relate to climate change. However, these impacts are potential rather than actual, and given the large area of the site, these are not likely to be problematic during the next few rounds of Condition monitoring.

2007-2012 | M01.02 | droughts and less precipitations | Inside | Low | Negative | 16.55ha |

2007-2012 | M01.03 | flooding and rising precipitations | Inside | Low | Negative | 16.55ha |

### Mon. period | Future Prospects Notes
--- | ---
2013-2018 | The only activities/threats identified on the site in 2014 were non-intensive cattle grazing and some enrichment due to agricultural run-off. Both effects were negative, with the cattle grazing considered of medium rank and the enrichment low. Only small areas are showing the effects of these impacts, 2-3%. Based on this, the Future Prospects of the site are assessed to be Favourable (green).

2007-2012 | At present, there is no sign of deterioration to the habitat and therefore Future prospects have been assessed as Favourable.
Vertigo moulinsiana monitoring at Fin Lough (Offaly)

6. DISCUSSION

2013-2018

**Monitoring period**

**Area of occupancy:** Fin Lough is a shallow limestone lake surrounded by a complex of wetland habitats, 7km north-east of Shannonbridge in Co. Offaly. Access to the site from Shannonbridge is approximately 2km past Clonmacnoise on the R444.

**Discussion:**

This site consists of an infilling lake, and so contains a wide variety of transitional habitats. It also has areas of calcareous fen with Schoenus nigricans along its northern shore. There are large areas of habitat suitable for Vertigo moulinsiana. The site continues to have habitat in good condition and shows good future prospects, but received an Unfavourable (Red) assessment for its population. Only approximately half of sample locations were positive for the target species in 2014, compared to three-quarters when Moorkens & Killeen last surveyed. The abundances were lower also. As the habitat appears to still be in good condition, it is hoped that these results are the result of weather or a poor breeding year for the species. Monitoring in three years’ time will be very important in terms of assessing whether the population is indeed declining.

**Monitoring recommendations:**

Recommended monitoring is as per Moorkens & Killeen (2011) at three yearly intervals:

- Repeat Transect 1. In field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Repeat Transect 2, as above, minimum 12 samples
- Repeat Transect 3, as above, minimum 10 samples
- Repeat Transect 4, as above, minimum 7 samples
- Take at least 2 samples at each from at least 10 other locations with optimal habitat, record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

**Management recommendations:**

The site is largely fenced off from grazing cattle in the surrounding lands. At this time, no changes are necessary with regard to the management of the site for Vertigo moulinsiana.

---

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Overall Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>While the habitat and Future Prospects assessments were both Favourable (green), the Unfavourable Bad (red) result for the population assessment has resulted in an overall assessment of Unfavourable Bad (red).</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Fin Lough is a very good site for Vertigo moulinsiana. Optimal habitat occurs over an area of at least 16ha and possibly more. The snail is present in good numbers over a wide area, and there appear to be few imminent threats.</td>
</tr>
</tbody>
</table>

While the habitat and Future Prospects assessments were both Favourable (green), the Unfavourable Bad (red) result for the population assessment has resulted in an overall assessment of Unfavourable Bad (red).
Vertigo moulinsiana monitoring at Fin Lough (Offaly)

Area of occupancy: Fin Lough is a shallow limestone lake surrounded by a complex of wetland habitats, 7 km north-east of Shannonbridge in Co. Offaly. Access to the site from Shannonbridge is approximately 2km past Clonmacnoise on the R444.

Discussion:

Monitoring recommendations:
Given the Favourable Condition of the site, it is recommended that monitoring is carried out at 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2011
Methods (see Section 4 of main report for full details). Prescription as follows:
- Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Repeat transect 2, as above, minimum 12 samples
- Repeat transect 3, as above, minimum 10 samples
- Repeat transect 4, as above, minimum 7 samples
- Take at least 2 samples at each from at least 10 other locations with optimal habitat, record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
Existing Management
Fin Lough is grazed by cattle that are moved to different areas around the site from the fields and slopes above. The landowner belongs to the REPS scheme. The grazing is complicated by the movement of fences from time to time, such that the management units do not have permanent boundaries from year to year at present. However, the majority of V. moulinsiana habitat is fenced and only subject to small-scale poaching.

Proposed management prescription for Vertigo moulinsiana

Whilst there is some small-scale, localized poaching of habitat, grazing at Fin Lough is more of an issue for Vertigo geyeri than V. moulinsiana (Moorkens 2006).

With current management practice, there are no short to medium-term threats to the Vertigo moulinsiana population. In the longer term, continued contraction of the lake may for a while provide more V. moulinsiana habitat but this will be offset by a contraction of the existing most suitable marginal fringe habitat. Ultimately, without intervention (i.e. providing additional water to the lake) the site will dry out and become carr and scrub, the V. moulinsiana habitat will diminish and eventually disappear along with the snail. This may be preventable with a drain blockage scheme in the future.

No management specific to V. moulinsiana is recommended until the next round of monitoring when it should be reviewed.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM03  County: Westmeath
SAC Site Code: 000688  Lough Owel

Location description (from baseline survey):
The habitat that supports Vertigo moulinsiana within this site lies along the canal feeder from Lough Owel and in fen on either side of the road from
the bridge at N424563 to the lake. Access is from the road and lakeshore car park.

1.2 General Habitat Description (from baseline survey):
The general habitat in which Vertigo moulinsiana is present at Lough Owel is a low lying old canal area of swamp fen with some spring flushing. The
snail is found typically on Glyceria maxima in association with Phalaris arundinacea, and Iris pseudacorus with some sub storey mosses. The water
was above ground surface level in places. There are no EU habitats that correspond to this habitat, the closest CORINE category would be
Atlantic and sub-Atlantic humid meadows (37.21) (Devillers et al., 1991). This falls within the more general habitat of rich fen and flush (PF1),
freshwater marsh (GM1), reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Tall Carex species, Equisetum fluviatile, Carex
paniculata, Iris pseudacorus

Class II: Phalaris arundinacea, Eriophorum angustifolium,
Cladium mariscus

Class III: Filipendula ulmaria, Epilobium hirsutum, Menyanthes
trifoliata, Mentha aquatica

Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:
Numbers of V. moulinsiana recorded at this site, as well as the number of locations from which it was found, both decreased compared with the
previous survey. 2014 was a relatively dry year, and this may have had an effect on numbers. Apart from polygon C, where the transect is located,
the site appears to still be suitable. No changes in management are recommended currently, but monitoring within three years is imperative to
investigate if weather or other factors are responsible for the low numbers recorded.

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT</th>
<th>MONITORING PERIOD</th>
<th>Start point</th>
<th>End point</th>
<th>Transect length</th>
<th>Direction</th>
<th>Description</th>
<th>Sampling frequency</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TRANSECT</th>
<th>MONITORING PERIOD</th>
<th>Start point</th>
<th>End point</th>
<th>Transect length</th>
<th>Direction</th>
<th>Description</th>
<th>Sampling frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2007-2012</td>
<td>N 42173 56307</td>
<td>N 42215 56279</td>
<td>50</td>
<td>NW-SE</td>
<td>5m towards the lake from a bankside alder tree (at 35m distance, the transect is in line with a roadside telegraph pole)</td>
<td>16 samples were taken at 5m or 10m intervals. At each interval, one sample was taken on the canal feeder side of the line (right R) or on the landward side of the line (left L)</td>
</tr>
</tbody>
</table>
**4. RESULTS**

### Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Optimal-Suboptimal</td>
<td>1.5756</td>
<td>Polygon A status remains Optimal-Suboptimal. The habitat is mostly patches of sedges with pools, but there are also areas of wet grassland. While the polygon boundary has remained the same, the area has changed in order to correct a previous error.</td>
</tr>
<tr>
<td>B</td>
<td>Optimal-Suboptimal</td>
<td>3.929</td>
<td>Polygon B status remains Optimal-Suboptimal. The habitat includes grazed sedge-rich sward and reed swamp, dominated by Phragmites australis. While the polygon boundary has remained the same, the area has changed in order to correct a previous error.</td>
</tr>
<tr>
<td>C</td>
<td>Optimal-Suboptimal</td>
<td>0.1945</td>
<td>Polygon C status has dropped from Optimal and Sub-optimal to Suboptimal due to succession and drying out. The habitat is now grassy, with Phalaris arundinacea and brambles. While the polygon boundary has remained the same, the area has changed in order to correct a previous error.</td>
</tr>
</tbody>
</table>

### Monitoring Period: 2007-2012

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Sub-optimal with optimal areas</td>
<td>3.839</td>
<td>Polygon A - Fen meadow with patches of Iris, Cladium and large pools. It should be noted that all of the flush habitat is contained within the boundaries of these polygons, but because V. moulinsiana habitat is often dendritic, not all of the total area of each will be optimal or sub-optimal habitat.</td>
</tr>
<tr>
<td>B</td>
<td>Sub-optimal with optimal areas</td>
<td>15.756</td>
<td>Polygon B - Extensive area on south side of canal feeder with wet fen meadow, runnels with sedges, small areas of flush, canal margins</td>
</tr>
<tr>
<td>C</td>
<td>Sub-optimal with optimal areas</td>
<td>1.945</td>
<td>Polygon C - Strip between the road to the lakeshore car park and the north bank of the canal feeder. Tall fen vegetation particularly at the lake end but becoming ranker and with more bramble towards the SE end</td>
</tr>
</tbody>
</table>

### Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
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<tbody>
<tr>
<td>Monitoring period 2013-2018 Transect 1 (16 samples)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>1</td>
<td>0m a</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>II</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>2</td>
<td>0m b</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>II</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>3</td>
<td>5m a</td>
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<td>0</td>
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<td>2013-2018</td>
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<td>5</td>
<td>10m a</td>
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<td>IV</td>
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<td>Suboptimal</td>
</tr>
<tr>
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<td>8</td>
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<td>0</td>
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<td>IV</td>
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<td>Suboptimal</td>
</tr>
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<td>2013-2018</td>
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<tr>
<td>2013-2018</td>
<td>1</td>
<td>10</td>
<td>30m b</td>
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<td>0</td>
<td>0</td>
<td>II</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
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<td>11</td>
<td>35m a</td>
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<td>IV</td>
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<td>Suboptimal</td>
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<tr>
<td>2013-2018</td>
<td>1</td>
<td>12</td>
<td>35m b</td>
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<td>40m a</td>
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<td>III</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>14</td>
<td>40m b</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>III</td>
<td>2</td>
<td>Suboptimal</td>
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<td>2013-2018</td>
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<td>15</td>
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<td>II</td>
<td>2</td>
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<td>2013-2018</td>
<td>1</td>
<td>16</td>
<td>50m b</td>
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<td>0</td>
<td>0</td>
<td>II</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
</tbody>
</table>

| Monitoring period 2007-2012 Transect 1 (16 samples) |
| 2007-2012   | 1        | 1      | 0m right | 63      | 29        | 92    | 3          |
| 2007-2012   | 1        | 2      | 0m left  | 48      | 33        | 81    | 3          |
| 2007-2012   | 1        | 3      | 5m right | 0       | 2         | 2     | 3          |
Vertigo moulinsiana monitoring at Lough Owel

<table>
<thead>
<tr>
<th>Monitoring period 2007-2012 (58 samples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012 01a</td>
</tr>
<tr>
<td>2007-2012 01b</td>
</tr>
<tr>
<td>2007-2012 01c</td>
</tr>
<tr>
<td>2007-2012 01d</td>
</tr>
<tr>
<td>2007-2012 01e</td>
</tr>
<tr>
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Spot Samples

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### Vertigo moulinsiana monitoring at Lough Owel

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Vertigo moulinsiana monitoring at Lough Owel

5. CONDITION ASSESSMENT

5.1 Population Assessment: 3 passes Favourable (green); 1-2 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Density</td>
<td>At least 3 samples contain 20 or more adult and juvenile snails</td>
<td>None of 16 samples with 20 or more adults/juveniles</td>
<td>Fail</td>
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<tr>
<td>2013-2018</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 10 samples (from a minimum of 16 taken) on the Transect</td>
<td>Present in 3 samples</td>
<td>Fail</td>
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<tr>
<td>2007-2012</td>
<td>1</td>
<td>Density</td>
<td>At least 3 samples contain 20 or more adult and juvenile snails</td>
<td>4 samples with 20 or more adults and juveniles</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 10 samples (from a minimum of 16 taken) on the Transect</td>
<td>Present in 13 samples</td>
<td>Pass</td>
</tr>
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</table>

5.2 Habitat Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

<table>
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<tr>
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<th>Indicator</th>
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<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>12 samples (75%) on the Transects are dominated by suitable vegetation (mostly Classes I &amp; II)</td>
<td>10 samples suitable</td>
<td>Fail</td>
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Vertigo moulinsiana monitoring at Lough Owel

5.2.2 Site level

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<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>5-6ha of the site with optimal and sub-optimal areas (NB: Target adjusted from 20-22ha, which was set in error)</td>
<td>5.70ha Optimal-Suboptimal</td>
<td>Pass</td>
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<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>20-22ha of the site with optimal and sub-optimal areas</td>
<td>5.70</td>
<td>Pass</td>
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Mon. period Habitat Notes

2013-2018 Polygons A and B were classified as Optimal-Suboptimal following the current survey, which is unchanged from the 2007-2012 sampling period. Polygon C, where the transect is located, was downgraded from Optimal and sub-optimal in 2007-2012, to Suboptimal owing to ecological change evidenced by the fact that it is now very dry and grassy, with dense vegetation and scrub encroachment (bramble). Based on the criteria of Moorkens & Killeen (2011), the Habitat Assessment is Unfavourable Inadequate (amber).

2007-2012

5.3 Future Prospects Assessment

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<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
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</thead>
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<td>2013-2018</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Medium</td>
<td>Positive</td>
<td>60%</td>
<td>Enrichment evidenced by Ranunculus repens, etc. in Polygon A, but quite limited in extent.</td>
</tr>
<tr>
<td>2013-2018</td>
<td>H02.06</td>
<td>diffuse groundwater pollution due to agricultural and forestry activities</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>5%</td>
<td></td>
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<tr>
<td>2013-2018</td>
<td>K02.01</td>
<td>species composition change (succession)</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>10%</td>
<td>Bramble encroaching at transect and change to drier, grassy species.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Neutral</td>
<td>91%</td>
<td>The level of grazing appears to be low and is at present having neither a positive nor negative effect.</td>
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<tr>
<td>2007-2012</td>
<td>A04.02.03</td>
<td>non intensive horse grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Neutral</td>
<td>91%</td>
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Mon. period Future Prospects Notes

2013-2018 Two negative impacts that were not observed in 2008 were recorded in 2014 - enrichment and succession. However, it should be noted that these impacts are affecting a small area only. For this reason, the Future Prospects have been assessed as Favourable (green).

2007-2012 The level of grazing appears to be low and is at present having neither a positive or negative effect. As the impact is low, Future prospects have been assessed as Favourable.

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
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<td>Amber</td>
<td>Green</td>
<td>Amber</td>
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<tr>
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<td>Green</td>
<td>Green</td>
<td>Green</td>
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6. DISCUSSION

Monitoring period

2013-2018

**Area of occupancy:** As in 2007-2012, the habitat that supports Vertigo moulinsiana within this site lies along the canal feeder from Lough Owel and in fen on either side of the road from the bridge at N424563 to the lake. Access is from the road and lakeshore car park.

**Discussion:**

Numbers of Vertigo moulinsiana recorded at this site, as well as the number of locations from which it was found, both decreased compared with the previous survey. 2014 was a relatively dry year, and this may have had an effect on numbers. Apart from Polygon C, where the transect is located, the site appears to still be suitable. The location of the transect at this site should be re-considered as it is sited in an isolated area that is atypical for the site as a whole. No changes in management are recommended currently, but monitoring within three years is imperative to investigate if weather or other factors are responsible for the low numbers recorded.

**Monitoring recommendations:**

- Repeat the transect. In field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile)
- Take samples from at least 6 other locations with optimal habitat, record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

**Management recommendations:**

This site is currently managed by cattle grazing (and perhaps horses?), at least in polygons A and B. This is appropriate for supporting Vertigo moulinsiana, and the current levels appear to be suitable. There is no grazing in Polygon C, the strip along the feeder canal, and this area appears to be drying out and bramble is encroaching. It is likely to be difficult to counteract the changes which are taking place in this polygon. The water level in the canal is considerably below the bank-full height and so may not be able to contribute appreciably to the wetness levels in Polygon C. It is likely that grazing would be beneficial in this polygon in terms of keeping scrub encroachment at bay, but its size and location are likely to be deterrents to this management. Furthermore, if drying out continues, this would negate benefits obtained from grazing. A fuller understanding of the hydrology of this polygon is needed before more detailed management prescriptions can be made. It is suggested in the meantime that efforts should be focused on the two more suitable, and much larger, polygons at this site.

2007-2012

**Area of occupancy:** The habitat that supports Vertigo moulinsiana within this site lies along the canal feeder from Lough Owel and in fen on either side of the road from the bridge at N424563 to the lake. Access is from the road and lakeshore car park.

**Discussion:**

Lough Owel is a very good site for Vertigo moulinsiana. Optimal habitat occurs over a relatively wide area on both the north and south side of the canal feeder. The snail is also present in good numbers over a wide area, with a relatively high proportion of juveniles present. There appear to be few imminent threats.

**Overall Notes**

**2013-2018**

Based on the lower number of positive samples for Vertigo moulinsiana, the decreased habitat suitability of the transect polygon, the Overall Assessment for Lough Owel is Unfavourable Inadequate (amber).

**2007-2012**

Lough Owel is a very good site for Vertigo moulinsiana. Optimal habitat occurs over a relatively wide area on both the north and south side of the canal feeder. The snail is also present in good numbers over a wide area, with a relatively high proportion of juveniles present. There appear to be few imminent threats.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM04  County: Laois
SAC Site Code: 002141  Mountmellick

1.2 General Habitat Description (from baseline survey):

The general habitat in which Vertigo moulinsiana is present at Mountmellick is a low lying old canal area of swamp fen with some spring flushing. The snail is found typically on Glyceria maxima in association with Phalaris arundinacea, and Iris pseudacorus with some sub storey mosses. The water table was above ground surface level in places. There are no EU habitats that correspond to this habitat, the closest CORINE category would be Atlantic and sub-Atlantic humid meadows (37.21) (Devillers et al., 1991). This falls within the more general habitat of rich fen and flush (PF1), freshwater marsh (GM1), reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Glyceria maxima
Class II: Phragmites australis, Iris pseudacorus, Phalaris arundinacea
Class III: Epilobium hirsutum, Agrostis stolonifera, Rorippa nasturtium-aquaticum, Urtica dioica, Juncus spp.
Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

1.5 Monitoring period and date surveyed:

<table>
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<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>15 Oct 2014</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>18 September 2008</td>
<td>Evelyn Moorkens &amp; Ian Killeen</td>
</tr>
</tbody>
</table>

2. SUMMARY:

This site possesses a significant length of disused canal bed which was all classed as Sub-optimal or better, with two-thirds of its length containing some Optimal habitat. Consequently it was surprising that only 50% of samples were positive (compared to 93% in 2008), and also that numbers were generally low (apart from three samples at the southern end). Moorlens & Killeen (2011) raised the issue of success and drying out at this site, threats which face many disused canal beds. It may be that this site is beginning to show signs of these processes (e.g. only 73% of samples in 2014 were classed as having optimal wetness for V. moulinsiana, compared to 90% in 2009). However, 2014 was a very dry year, and 2008 was a very wet one. Monitoring must be carried out at this site within three years to attempt to ascertain if the lower numbers constitute a trend, and if so, measures must be taken to maintain the sites wetness (e.g. blocking of outflow).

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT</th>
<th>MONITORING PERIOD</th>
<th>Start point</th>
<th>End point</th>
<th>Transect length</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of open canal habitat (barbed wire fence) where it becomes very overgrown and shaded</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Near Dangan’s Bridge</td>
</tr>
</tbody>
</table>

4. RESULTS
**Vertigo moullinsiana monitoring at Mountmellick**

### Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Monitoring Period:</th>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A</td>
<td>Optimal</td>
<td>0.2244</td>
<td>Polygon A remains Optimal habitat and consists of tall-growing wetland vegetation in the canal bed. The polygon boundary was altered to better reflect the habitat extent, which is limited to the canal bed. (NB: The area recorded by Moorkens &amp; Killeen below should read 0.148ha)</td>
</tr>
</tbody>
</table>

### Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>1</td>
<td>0m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>II</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>2</td>
<td>5m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>3</td>
<td>10m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>4</td>
<td>15m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>5</td>
<td>20m</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
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<td>25m</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>7</td>
<td>30m</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>8</td>
<td>35m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>9</td>
<td>40m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>II</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>10</td>
<td>45m</td>
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<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
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<tr>
<td>2013-2018</td>
<td>1</td>
<td>11</td>
<td>50m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>12</td>
<td>55m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
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<td>60m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>14</td>
<td>65m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>15</td>
<td>70m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>16</td>
<td>75m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>17</td>
<td>80m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>III</td>
<td>3</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>18</td>
<td>85m</td>
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<td>0</td>
<td>0</td>
<td>III</td>
<td>3</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>19</td>
<td>90m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>III</td>
<td>3</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>20</td>
<td>95m</td>
<td>2</td>
<td>7</td>
<td>9</td>
<td>II</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>21</td>
<td>100m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>II</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>22</td>
<td>105m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>23</td>
<td>110m</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>24</td>
<td>115m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
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<tr>
<td>2013-2018</td>
<td>1</td>
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<td>120m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>26</td>
<td>130m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>27</td>
<td>140m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>28</td>
<td>150m</td>
<td>3</td>
<td>10</td>
<td>13</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>29</td>
<td>160m</td>
<td>5</td>
<td>15</td>
<td>20</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>30</td>
<td>170m</td>
<td>10</td>
<td>90</td>
<td>100</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
</tbody>
</table>

### Monitoring period 2007-2012 Transect 1 (30 samples)

<table>
<thead>
<tr>
<th>Monitoring period 2007-2012 Transect 1 (30 samples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
</tr>
</tbody>
</table>

---

**Monitoring period:** 2013-2018

- **Transect samples**

**Monitoring period:** 2007-2012

- **Polygon A** remains Optimal habitat and consists of tall-growing wetland vegetation in the canal bed. The polygon boundary was altered to better reflect the habitat extent, which is limited to the canal bed. (NB: The area recorded by Moorkens & Killeen below should read 0.148ha)

- **All habitat within the canal bed**
Vertigo moulinsiana monitoring at Mountmellick

5. CONDITION ASSESSMENT

5.1 Population Assessment: 2 passes Favourable (green); 1 pass Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Density</td>
<td>10 samples contain at least 20 adult and juvenile snails</td>
<td>2 samples contain at least 20 adult and juvenile snails</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 23 samples (75% of a minimum of 30 samples) on the Transect</td>
<td>V. moulinsiana is present in 15 samples (50% of 30 samples) on the Transect</td>
<td>Fail</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Density</td>
<td>10 samples contain at least 20 adult and juvenile snails</td>
<td>19 samples with 20 or more adults and juveniles</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 23 samples (75% of a minimum of 30 samples) on the Transect</td>
<td>Present in 28 of the 30 samples (93%)</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Spot Samples

Mon. period Population Notes

2013-2018 The population of Vertigo moulinsiana at Mountmellick appears to have fallen based on the current survey results. In 2007-2012, positive samples accounted for 28 of 30 locations, while in the current survey only 15 of 30 locations were positive.
5.2 Habitat Assessment:  
3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>25 samples (or 80%) on the Transect is dominated by suitable vegetation (Classes I &amp; II)</td>
<td>27 samples (90%) on the Transect is dominated by suitable vegetation (Classes I &amp; II)</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat quality</td>
<td>25 samples (or 80%) on the Transect fall within soil moisture classes 3-5</td>
<td>22 samples (73%) on the Transect fall within soil moisture classes 3-5</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat extent</td>
<td>25 samples (or 80%) on the Transect is dominated by suitable vegetation (Classes I &amp; II)</td>
<td>30 samples suitable</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat quality</td>
<td>25 samples (or 80%) on the Transect fall within soil moisture classes 3-5</td>
<td>30 samples suitable</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>Suitable habitat should exist in the canal bed throughout the c.170m length from old Dangan’s Bridge at the western edge and the fence/woodland at N 491 085. (Habitat area of 1.4ha mentioned below is incorrect.)</td>
<td>Habitat is Suboptimal or better all along the 170m transect.</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>Suitable habitat should exist in the canal bed throughout the c.170m length from old Dangan’s Bridge at the western edge and the fence/woodland at N 491 085 – an area of c. 1.4ha</td>
<td>Target fulfilled</td>
<td>Pass</td>
</tr>
</tbody>
</table>

2013-2018 The Vertigo moulinsiana habitat polygon continues to be considered Optimal, unchanged from the 2007-2012 survey period (the target area of 1.4ha in Moorkens & Killeen (2011) is incorrect and should have been 0.14ha). There is some evidence of drying out of parts of the habitat to the north end of the transect, which will negatively impact on the snail. Based on the criteria of Moorkens & Killeen (2011), the Habitat Assessment is Unfavourable Inadequate (amber).

2007-2012 Although there has been some recent damage, most of the habitat at the site appears to be in good condition for V. moulinsiana.

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A04.02.03</td>
<td>non intensive horse grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>65%</td>
<td>Trampling &amp; dung seen at site</td>
</tr>
<tr>
<td>2013-2018</td>
<td>H05</td>
<td>Soil pollution and solid waste (excluding discharges)</td>
<td>Outside</td>
<td>Low</td>
<td>Negative</td>
<td>5%</td>
<td>Dumping of manure &amp; straw on canal bank</td>
</tr>
<tr>
<td>2013-2018</td>
<td>H05.01</td>
<td>garbage and solid waste</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>5%</td>
<td>Significant quantities of dumped household waste at southern end of site by bridge and road.</td>
</tr>
<tr>
<td>2013-2018</td>
<td>K01.03</td>
<td>Drying out</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Mountmellick

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Red</td>
<td>Amber</td>
<td>Amber</td>
<td>Red</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: As in 2007-2012, the habitat that supports Vertigo moulinsiana within this cSAC is the swamp fen habitat of the disused canal between the old Dangan’s Bridge at the western edge and the fence at N 491 085. Access is from Dangan’s Bridge at N 490 084.

Discussion:

This site possesses a significant length of disused canal bed which was all classed as Suboptimal or better, with two-thirds of its length containing some Optimal habitat. Consequently it was surprising that only 50% of samples were positive (compared to 93% in 2008), and also that numbers were generally low (apart from three samples at the southern end). Moorkens & Killeen (2011) raised the issue of succession and drying out at this site, threats which face many disused canal beds. It may be that this site is beginning to show signs of these processes (e.g. only 73% of samples in 2014 were classed as having Optimal wetness for Vertigo moulinsiana, compared to 90% in 2009). However, 2014 was a very dry year, and 2008 was a very wet one. Monitoring must be carried out at this site within three years to attempt to ascertain if the lower numbers constitute a trend, and if so, measures must be taken to maintain the sites
Vertigo moulinsiana monitoring at Mountmellick

Monitoring recommendations:
Monitoring is recommended on a 3-yearly basis, as per Moorkens & Killeen (2011):

- Repeat Transect 1. In field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 30 samples
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
Management recommendations for Mountmellick include the removal of dumped garbage and manure and a slight reduction in the grazing by horses to allow the tall vegetation required by Vertigo moulinsiana to again become dominant at the site. It appears that succession and drying may be beginning to negatively impact the habitat, so some means of increasing/maintaining the wetness may need to be found in the future (e.g. blocking of outflow). The additional management details provided in Moorkens & Killeen (2011) are still relevant and should be referred to.
Vertigo moulinsiana monitoring at Mountmellick

2007-2012

**Area of occupancy:** The habitat that supports Vertigo moulinsiana within this cSAC is the swamp fen habitat of the disused canal between the old Dangan’s Bridge at the western edge and the fence at N 491 085. Access is from Dangan’s Bridge at N 490 084.

**Discussion:**
The results obtained in 2008 are very similar to those obtained in 2006. For example, in 2008 the mean number of snails per sample was 51.9 compared to 56.7 in 2006. However, in 2008 ground moisture levels were very high with the majority of the site being in Class 5 - in standing water over 5cm deep. This probably reflects the very wet summer of 2008.

In late 2007/early 2008 it was reported that a large quantity of rubbish had been tipped into the central part of the site from the north bank. This was subsequently removed at the request of NPWS. The survey in September 2008 showed that a section of just under 20m in length had been affected from a position of approximately 90m on the transect towards Dangan’s Bridge. The entire width of the canal had been affected with the loss of virtually all of the suitable tall swamp vegetation in this section. The habitat in the impacted area comprised pools of standing water with large quantities of filamentous algae, with sparse Lemna, Glyceria fluitans and Rorippa. Some rubble is still present on the north bank. It is likely that the habitat and Vertigo moulinsiana population will, in time, recover in the impacted area. Longer term succession needs to be monitored and the dominant vegetation noted in the transect can be used for this purpose. The 170m long transect was chosen for this purpose.

**Monitoring recommendations:**
Given the Favourable Condition of the site, it is recommended that monitoring is carried out at 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

**Frequency:** Next monitoring due 2011
**Methods** (see Section 4 of main report for full details). Prescription as follows:
- Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 30 samples
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

**Management recommendations:**
**Existing Management**
The site at Mountmellick is grazed by cattle within the wider area that include the fields on either side of the unused canal. From the evidence on the ground, it appears that some cattle may enter the drier areas of the canal floor, particularly from the North, but not the very wet swampy areas where V. moulinsiana is most abundant. They play an important role in grazing the line along the canal edges where scrub could otherwise take hold and create a tunneling effect. Part of the canal area was used for dumping in late 2007/early 2008 with resultant loss of habitat (see Discussion).

**Proposed management prescription for Vertigo moulinsiana**
The management at Mountmellick should remain the same as the present regime within the management unit for the 2007-2011 period. This works out at approximately 1 livestock unit per hectare based on observed current rates, and grazing periods can remain flexible as the grazing area mainly consists of improved grassland, which will vary from year to year in its capacity to carry livestock. As with all SACs for this species, damaging actions should not take place. Supplementary feeding of stock should not take place within 50m of the canal, no lime or fertiliser of any sort should be introduced within 50m of the canal. No reclamation, infilling, ploughing or land drainage, reseeding, planting of trees or any other species, removal of aquatic vegetation, use of pesticide or herbicide in the canal area or within 50m of the canal. No dumping of rubbish or other materials or storing or disposing of any chemicals or wastes in or within 50m of the canal including the land spreading of used pesticides (e.g. sheep dip). No alteration of the banks, channel, bed or spring flow into the canal or of watercourses running into or out of it, including extracting water for irrigation or other purposes should take place.
Vertigo moulinsiana monitoring at Louisa Bridge

1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM05 County: Kildare
SAC Site Code: 001398 Rye Water Valley/Carton

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>22-23 Oct 2014</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>9 October 2008</td>
<td>Evelyn Moorkens &amp; Ian Killeen</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

The general habitat in which Vertigo moulinsiana is present at Louisa Bridge is a low lying area of flood plain. The EU habitats that this relates to are water fringe vegetation comprising medium-tall waterside communities (CORINE 53.14) (Devillers et al., 1991). This does not fit within any Annex I habitat. The snail is found typically on Sparganium erectum and Glyceria maxima. The water table rises above ground surface level in places. Further up the slope lies tufaceous spring and alkaline fen habitat (HD Annex I 7220, 7230; CORINE 54.12, 54.2) (Romão, 1996; Devillers et al., 1991). Vertigo moulinsiana was found here on Deschampsia caespitosa, Typha angustifolia and Equisetum palustre. This lower habitat falls within the more general habitat of large sedge swamps (FS1) and tall herb swamps (FS2), and the higher area within Rich Fen and Flush (PF1) and calcareous springs (FP1) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

| Class I: Tall Carex species, Sparganium erectum, Glyceria maxima |
| Class II: Phragmites australis, Equisetum fluviatile, Typha angustifolia |
| Class III: Epilobium hirsutum, Mentha aquatica, Juncus spp., Deschampsia caespitosa, Eupatorium cannabinum |
| Class IV: All other species |

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

Vertigo moulinsiana was found at 6 out of 10 sample locations, though in lower numbers than in 2008. The population appears to have decreased, but habitat conditions remain good, and in the lower valley area they appear to have improved such that three out of the four samples in Polygon E were positive. Overall, this site needs no management change or intervention – but it does need to be protected from potentially well-meaning though damaging uses such as tree-planting, path creation or other increases in amenity usage. Re-survey in three years’ time is important in order to gain further information to allow a fuller assessment of the population trend.

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT: 0</th>
<th>MONITORING PERIOD: 2013-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start point:</td>
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<tr>
<td>End point:</td>
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</tr>
<tr>
<td>Transect length:</td>
<td>Direction:</td>
</tr>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>Sampling frequency:</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TRANSECT: 0</th>
<th>MONITORING PERIOD: 2007-2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start point:</td>
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<tr>
<td>End point:</td>
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<tr>
<td>Transect length:</td>
<td>Direction:</td>
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<tr>
<td>Description:</td>
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<td>Sampling frequency:</td>
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</table>

4. RESULTS
### Polygon habitat characteristics

**Monitoring Period:** 2013-2018

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Optimal</td>
<td>0.0724</td>
<td>Polygon A status remains Optimal-Suboptimal. The habitat is a small area of wetland dominated by tall Carex species. The boundary was redrawn to better delineate the habitat on the ground.</td>
</tr>
<tr>
<td>B</td>
<td>Suboptimal- Unsuitable</td>
<td>0.0801</td>
<td>Polygon B status remains Suboptimal- Unsuitable. The habitat is wet grassland with Iris pseudacorus, scrubbing over with Rubus fruticosus. The polygon boundary was redrawn to better reflect the situation on the ground.</td>
</tr>
<tr>
<td>C</td>
<td>Suboptimal</td>
<td>0.2082</td>
<td>Polygon C status changes to Suboptimal. It was created by merging two existing polygons; one Optimal and sub-optimal and one Sub-optimal and unsuitable, and redrawing the boundary. The habitat is wetland dominated by Carex spp.</td>
</tr>
<tr>
<td>D</td>
<td>Optimal-Suboptimal</td>
<td>0.065</td>
<td>Polygon D status remains Optimal-Suboptimal. The habitat is wetland dominated by Carex spp. The polygon boundary was redrawn slightly to remove the artificial gap between it and the adjacent polygon.</td>
</tr>
<tr>
<td>E</td>
<td>Optimal</td>
<td>0.1626</td>
<td>Polygon E status increases to Optimal. The polygon boundary was created by merging two polygons; one Suboptimal and Unsuitable and one Optimal-Suboptimal, which had similar vegetation. The habitat is riverside wetland dominated by tall vegetation (e.g. Glyceria maxima, Iris pseudacorus and Phragmites australis).</td>
</tr>
</tbody>
</table>

**Monitoring Period:** 2007-2012

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sub-optimal with unsuitable areas</td>
<td>0.471</td>
<td>4 polygon areas were considered to be a mosaic of Unsuitable and Sub-Optimal habitat, with the following areas: 1184m², 2461m², 1065m² giving a total of 0.471 ha.</td>
</tr>
<tr>
<td></td>
<td>Sub-optimal with optimal areas</td>
<td>0.204</td>
<td>The habitat is very fragmented but 4 polygon areas were considered to be a mosaic of Optimal and Sub-Optimal habitat, with the following areas: 490m², 347m², 767m², 439m² giving a total of 0.204ha.</td>
</tr>
</tbody>
</table>

### Transect samples

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<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
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<tbody>
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### Spot Samples

**Monitoring period 2013-2018 (31 samples)**

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<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
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<th>Total</th>
<th>Veg. class</th>
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<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
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Vertigo moulinsiana monitoring at Louisa Bridge

5. CONDITION ASSESSMENT

5.1 Population Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
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<td></td>
<td>NO TRANSECT RECORDED</td>
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</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Density</td>
<td>5 samples contain at least 10 adult and juvenile snails (based upon at least 20 samples)</td>
<td>2 samples contain at least 10 adult and juvenile snails (31 samples)</td>
<td>Fail</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 50% of the samples where the habitat is optimal (based upon at least 20 samples)</td>
<td>V. moulinsiana is present in 39% of the samples where the habitat is optimal (31 samples)</td>
<td>Fail</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Species extent</td>
<td>V. moulinsiana is present in 5 of the 10 sample areas</td>
<td>V. moulinsiana is present in 6 of the 10 sample areas</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Density</td>
<td>5 samples contain at least 10 adult and juvenile snails (based upon at least 20 samples)</td>
<td>5 samples with at least 10 individuals</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 50% of the samples where the habitat is optimal (based upon at least 20 samples)</td>
<td>in 19 out of 22 samples in 6 positive areas</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Species extent</td>
<td>V. moulinsiana is present in 5 of the 10 sample areas</td>
<td>Present in 6 areas</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2 Habitat Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

2013-2018 While the distribution of the Vertigo moulinsiana population at Louisa Bridge appears to be similar to 2007-2012, with six out of ten sample locations returning positive results, the number of individuals at each location is down on the previous sampling period. In addition, looking at subsamples taken at each of the ten sample locations, only 11 of 31 (35%) are now positive compared with 19 of 36 (53%) in 2007-2012. Based on the criteria of Moorkens & Killeen (2011), the Population Assessment is Unfavourable Bad (red).

2007-2012 the snail is present in moderate to low numbers
Vertigo moulinsiana monitoring at Louisa Bridge

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
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<td>2007-2012</td>
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5.2.2 Site level

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<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
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</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>&gt;0.2ha of the site comprising a mosaic of Optimal and sub-optimal habitat</td>
<td>0.51ha Suboptimal or higher</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>&gt;0.2ha of the site comprising a mosaic of Optimal and sub-optimal habitat</td>
<td>0.204 ha</td>
<td>Pass</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>5 of the 10 sample areas are classed as Optimal/Sub-optimal or better</td>
<td>5 of the 10 sample areas are classed as Optimal/Sub-optimal or better</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Habitat quality</td>
<td>5 of the 10 sample areas fall within soil moisture classes 3-5</td>
<td>7 of the 10 sample areas fall within soil moisture classes 3-5</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>5 of the 10 sample areas are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>6 sample areas suitable</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat quality</td>
<td>5 of the 10 sample areas fall within soil moisture classes 3-5</td>
<td>8 sample areas suitable</td>
<td>Pass</td>
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</table>

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
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<tbody>
<tr>
<td>2013-2018</td>
<td>H05.01</td>
<td>garbage and solid waste</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>K02.01</td>
<td>species composition change (succession)</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>20%</td>
<td>Encroachment by trees including Salix spp. and Crataegus monogyna.</td>
</tr>
<tr>
<td>2013-2018</td>
<td>K04.05</td>
<td>damage by herbivores (including game species)</td>
<td>Inside</td>
<td>Low</td>
<td>Positive</td>
<td>3%</td>
<td>Deer trampling</td>
</tr>
<tr>
<td>2007-2012</td>
<td>J02.01.03</td>
<td>infilling of ditches, dykes, ponds, pools, marshes or pits</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>1.49ha</td>
<td>In the past, serious levels of dumping occurred at the site, resulting in infilling of habitat. This problem appears to have been addressed, but needs to ensure it will not reoccur at some point in the future.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>K02.01</td>
<td>species composition change (succession)</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>1.49ha</td>
<td>Early warning of succession has been incorporated in the condition monitoring at this site.</td>
</tr>
</tbody>
</table>

5.3 Future Prospects Notes

2013-2018 Threats to the site include succession, littering, and trampling by deer. The soil moisture of the site is maintained by groundwater and this is an important element maintaining the suitability of the site for Vertigo moulinsiana. While the gradual change in vegetation types (suggested by encroachment and trees/scrub) may pose a risk to the target species in the long-term, at the current time the Future Prospects are considered to be Favourable (green).
Vertigo moulinsiana monitoring at Louisa Bridge

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Red</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

2007-2012

2013-2018

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: As in 2007-2012, the habitat that supports Vertigo moulinsiana within this cSAC is the tall marsh habitat at the base of the slope with in the Rye River flood plain. Access is from the main road just to the west of the Louisa Bridge railway station and the Royal Canal.

Discussion:

Vertigo moulinsiana was found at 6 out of 10 sample locations, though in lower numbers than in 2008. The population appears to have decreased, but habitat conditions remain good, and in the lower valley area they appear to have improved such that three out of the four samples in Polygon E were positive. Overall, this site needs no management change or intervention, but it does need to be protected from potentially well-meaning, though damaging, uses such as tree-planting, path creation or other increases in amenity usage. Re-survey in three years’ time is important in order to gain further information to allow a fuller assessment of the population trend.

Monitoring recommendations:

Monitoring recommendations are as per Moorkens & Killeen (2011), on a 3-yearly basis:

- Take at least 30 samples from a total of 10 sample locations. In field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:

There is currently no evidence of active management of the site, with ground moisture maintaining the vegetation. No management actions are recommended for this site, though this may change following future monitoring. Notes pertaining to the land use at this site (e.g. for amenity, parkland, etc.) made by Moorkens & Killeen (2011) should be noted.
Vertigo moulinsiana monitoring at Louisa Bridge

2007-2012

Area of occupancy: The habitat that supports Vertigo moulinsiana within this cSAC is the tall marsh habitat at the base of the slope with in the Rye River flood plain. Access is from the main road just to the west of the Louisa Bridge railway station and the Royal Canal.

Discussion:
Comparison of the 2008 results with those from 2006 does not show any significant change. The habitat, and, therefore, the distribution of the snail at Louisa Bridge remains patchy and discontinuous, and the snail is still largely absent from the floodplain in the valley floor. The numbers of snails recorded in 2008 were slightly lower than in 2006, but this is mainly a result of lower numbers of juveniles recorded. This is likely to reflect the timing of the snail’s main reproductive event in different years.

Monitoring recommendations:
Given the Favourable Condition of the site, it is recommended that monitoring is carried out at 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2011

Methods (see Section 4 of main report for full details). Prescription should follow exactly the 2008 survey as follows:
- Take at least 30 samples from a total of 10 sample locations 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

Management recommendations:

Existing Management

The V. moulinsiana habitats at this site comprises a single management unit. There is currently no grazing or other active management within the site of the V. moulinsiana habitat. In the past there has been very serious dumping within the V. moulinsiana upper habitat, but this has been removed and the habitat has shown good recovery.

Proposed management prescription for Vertigo moulinsiana

The management at the V. moulinsiana habitats at Louisa Bridge should remain the same as the present regime, i.e. no active management for the 2008-2011 period. There should be no grazing, tree planting or amenity paths put along the river flood plain habitat area. There should be no draining, amenity paths or dumping of any kind allowed in the upper spring areas.

In terms of importance, this V. moulinsiana population rates highly, as due to the continuous spring water source it is self-sustaining, and management is solely due to wetness levels, which is easier to manage on a long term basis than sites requiring active management. The location of the population at Louisa Bridge at the intersection of the river and the canal is of prime importance for the maintenance and future spread of the species. With more enlightened canal bank management and the encouragement of fringe vegetation along both canal and river, the snail would have an excellent chance of further colonization.

The past problems with dumping and subsequent pollution have largely been addressed, and it is most important that the area is strictly protected from vandalism (see Moorkens 1995), dumping, spraying, drainage of the complex hydrogeological area that drive the springs, and also from well meaning schemes that could inadvertently change the habitat such as tree planting or amenity pathways. As the source of the spring water may be affected by draining and abstraction in locations that are relatively remote from the site, it is important that Kildare County Council consider the requirements of this site when assessing planning applications within the general jurisdiction.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM06  County: Clare

SAC Site Code: n/a  Not in SAC

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>30 September &amp; 1 October 2015</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>29 March 2009</td>
<td>Ian Killeen &amp; Evelyn Moorkens</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

Most of the lake is surrounded by woodland or grassland running right down to a rocky lakeshore, and there is very little potential V. moulinsiana habitat. Most of the suitable habitat lies at the very northern end of the lake where a broad swampy margin, dominated by Carex paniculata has developed. A large area of less suitable fen occurs further to the north. EU habitats present at Vertigo moulinsiana habitat are Alkaline fens: low sedge-rich communities (Annex I Habitat 7230), rich fens of CORINE 54.2 and fen-sedge beds of CORINE 53.3 (Romão, 1996; Devillers et al., 1991).

Principal habitats at the site include water fringe vegetation: reedbeds and large sedge communities including: common reed beds, dry Phragmites beds (53.112), medium-tall waterside communities (53.14), and large Carex beds (53.21).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Carex paniculata

Class II: Phragmites australis, Polygonum persicaria, Equisetum fluviatile, Typha angustifolia, Sparganium erectum

Class III: Epilobium hirsutum, Menyanthes trifoliata, Mentha aquatica

Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

The Overall Conservation Assessment for Ballybeg Lough in the monitoring period 2007-2012 was Favourable (green), but this has dropped to Unfavourable Inadequate (amber) for the current monitoring period (2013-2018) due to a drop in the number of positive samples, and also the number of individuals recorded, along the transects. The reason for this drop is unclear, as suitable vegetation is still present, and the wetness continues to be favourable. It may be, therefore, that the apparent drop in the Vertigo moulinsiana population is due to natural variation in the population. The habitat polygons at the site have been assessed as the same or better quality than the previous monitoring period, and this, along with the lack of major threats, has resulted in favourable Future Prospects. Polygon A is likely to benefit from intermittent grazing to prevent scrubbing over, with no management currently required for Polygon B, which is wet and supports abundant tall sedge and reed habitat.

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT: 1</th>
<th>MONITORING PERIOD: 2013-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start point:</td>
<td>R 33409 74115</td>
</tr>
<tr>
<td>End point:</td>
<td>R 33457 74135</td>
</tr>
<tr>
<td>Transect length:</td>
<td>50</td>
</tr>
<tr>
<td>Direction:</td>
<td>SW-NE</td>
</tr>
<tr>
<td>Description:</td>
<td>Transect follows the line of Carex Paniculata tussocks along the swampy margin of the lake</td>
</tr>
<tr>
<td>Sampling frequency:</td>
<td>Ten samples were taken at approximately 5m intervals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRANSECT: 2</th>
<th>MONITORING PERIOD: 2013-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start point:</td>
<td>R 33457 74135</td>
</tr>
<tr>
<td>End point:</td>
<td>R 33467 74110</td>
</tr>
<tr>
<td>Transect length:</td>
<td>25</td>
</tr>
<tr>
<td>Direction:</td>
<td>NW-SE</td>
</tr>
<tr>
<td>Description:</td>
<td>Transect follows the line of Carex paniculata tussocks along the swampy margin of the lake</td>
</tr>
<tr>
<td>Sampling frequency:</td>
<td>Four samples were taken at approximately 5m intervals</td>
</tr>
</tbody>
</table>
### Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Optimal-Suboptimal</td>
<td>1.871</td>
<td>Polygon A status remains Optimal-Suboptimal. Area following shoreline of lake, with large tussocks of Carex paniculata.</td>
</tr>
</tbody>
</table>
### Monitoring Period: 2013-2018

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Optimal</td>
<td>5.5054</td>
<td>Polygon B status upgraded to Optimal. The south-western section is mostly wet grassland, but the extensive north-eastern section is reed-bed and swamp, with large stands of Phragmites australis and Cladium mariscus.</td>
</tr>
</tbody>
</table>

### Monitoring Period: 2007-2012

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Sub-optimal with optimal areas</td>
<td>1.871</td>
<td>Polygon A - along the swamp margins</td>
</tr>
<tr>
<td>B</td>
<td>Sub-optimal with unsuitable areas</td>
<td>5.505</td>
<td>Polygon B - larger areas of taller fen or marsh</td>
</tr>
</tbody>
</table>

#### Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
</table>

**Monitoring period 2013-2018 Transect 1 (10 samples)**

| 2013-2018 | 1 | 1 | 0m | 0 | 1 | 1 | I | 2 | Optimal |
| 2013-2018 | 1 | 2 |     | 1 | 0 | 1 | I | 3 | Optimal |
| 2013-2018 | 1 | 3 |     | 0 | 0 | 0 | I | 3 | Optimal |
| 2013-2018 | 1 | 4 |     | 0 | 0 | 0 | I | 3 | Optimal |
| 2013-2018 | 1 | 5 |     | 0 | 0 | 0 | I | 3 | Optimal |
| 2013-2018 | 1 | 6 |     | 0 | 0 | 0 | I | 2 | Optimal |
| 2013-2018 | 1 | 7 |     | 0 | 0 | 0 | II| 3 | Optimal |
| 2013-2018 | 1 | 8 |     | 0 | 1 | 1 | I | 4 | Optimal |
| 2013-2018 | 1 | 9 |     | 2 | 2 | 4 | I | 4 | Optimal |
| 2013-2018 | 1 | 10|     | 0 | 1 | 1 | I | 3 | Optimal |

**Monitoring period 2013-2018 Transect 2 (4 samples)**

| 2013-2018 | 2 | 1 | 0m | 0 | 0 | 0 | I | 3 | Optimal |
| 2013-2018 | 2 | 2 |     | 0 | 0 | 0 | II| 3 | Optimal |
| 2013-2018 | 2 | 3 |     | 0 | 0 | 0 | I | 3 | Optimal |
| 2013-2018 | 2 | 4 |     | 1 | 0 | 1 | I | 3 | Optimal |

**Monitoring period 2013-2018 Transect 3 (10 samples)**

| 2013-2018 | 3 | 1 | 0m | 1 | 1 | 2 | I | 5 | Optimal |
| 2013-2018 | 3 | 2 |     | 1 | 0 | 1 | I | 5 | Optimal |
| 2013-2018 | 3 | 3 |     | 0 | 1 | 1 | I | 4 | Optimal |
| 2013-2018 | 3 | 4 |     | 0 | 1 | 1 | I | 5 | Optimal |
| 2013-2018 | 3 | 5 |     | 1 | 0 | 1 | I | 3 | Optimal |
| 2013-2018 | 3 | 6 |     | 0 | 0 | 0 | I | 4 | Optimal |
| 2013-2018 | 3 | 7 |     | 1 | 2 | 3 | I | 4 | Optimal |
| 2013-2018 | 3 | 8 |     | 1 | 1 | 2 | I | 5 | Optimal |
| 2013-2018 | 3 | 9 |     | 0 | 0 | 0 | I | 5 | Optimal |
| 2013-2018 | 3 | 10|     | 0 | 2 | 2 | I | 5 | Optimal |

**Monitoring period 2013-2018 Transect 4 (10 samples)**

| 2013-2018 | 4 | 1 | 0m | 1 | 0 | 1 | I | 4 | Optimal |
| 2013-2018 | 4 | 2 |     | 0 | 1 | 1 | I | 3 | Optimal |
| 2013-2018 | 4 | 3 |     | 0 | 0 | 0 | I | 4 | Optimal |
| 2013-2018 | 4 | 4 |     | 0 | 0 | 0 | I | 4 | Optimal |
| 2013-2018 | 4 | 5 |     | 0 | 0 | 0 | I | 3 | Optimal |
### Vertigo moulinsiana monitoring at Ballybeg Lough

**2013-2018**

<table>
<thead>
<tr>
<th>Year</th>
<th>Transect</th>
<th>Samples</th>
<th>Optimal</th>
<th>Suboptimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2013-2018</td>
<td>4</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013-2018</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013-2018</td>
<td>4</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013-2018</td>
<td>4</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Monitoring period 2007-2012 Transect 1 (10 samples)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Transect</th>
<th>Samples</th>
<th>Optimal</th>
<th>Suboptimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>1</td>
<td>0m</td>
<td>13</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>2</td>
<td>5m</td>
<td>7</td>
</tr>
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<td>2007-2012</td>
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<td>3</td>
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<td>2007-2012</td>
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<td>4</td>
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<td>5</td>
<td>20m</td>
<td>13</td>
</tr>
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<td>2007-2012</td>
<td>1</td>
<td>6</td>
<td>25m</td>
<td>6</td>
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<td>2007-2012</td>
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<td>7</td>
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<td>26</td>
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<td>8</td>
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</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>9</td>
<td>40m</td>
<td>9</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>10</td>
<td>45m</td>
<td>31</td>
</tr>
</tbody>
</table>

**Monitoring period 2007-2012 Transect 2 (4 samples)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Transect</th>
<th>Samples</th>
<th>Optimal</th>
<th>Suboptimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
<td>2</td>
<td>11</td>
<td>10m</td>
<td>2</td>
</tr>
<tr>
<td>2007-2012</td>
<td>2</td>
<td>12</td>
<td>15m</td>
<td>7</td>
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<tr>
<td>2007-2012</td>
<td>2</td>
<td>13</td>
<td>20m</td>
<td>6</td>
</tr>
<tr>
<td>2007-2012</td>
<td>2</td>
<td>14</td>
<td>25m</td>
<td>19</td>
</tr>
</tbody>
</table>

**Monitoring period 2007-2012 Transect 3 (12 samples)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Transect</th>
<th>Samples</th>
<th>Optimal</th>
<th>Suboptimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
<td>3</td>
<td>15</td>
<td>5m</td>
<td>0</td>
</tr>
<tr>
<td>2007-2012</td>
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</tr>
<tr>
<td>2007-2012</td>
<td>3</td>
<td>26</td>
<td>60m</td>
<td>0</td>
</tr>
</tbody>
</table>

**Monitoring period 2007-2012 Transect 4 (15 samples)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Transect</th>
<th>Samples</th>
<th>Optimal</th>
<th>Suboptimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
<td>4</td>
<td>27</td>
<td>5m</td>
<td>1</td>
</tr>
<tr>
<td>2007-2012</td>
<td>4</td>
<td>28</td>
<td>10m</td>
<td>14</td>
</tr>
<tr>
<td>2007-2012</td>
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<td>29</td>
<td>20m</td>
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<td>2007-2012</td>
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</tr>
<tr>
<td>2007-2012</td>
<td>4</td>
<td>32</td>
<td>40m</td>
<td>4</td>
</tr>
<tr>
<td>2007-2012</td>
<td>4</td>
<td>33</td>
<td>50m</td>
<td>2</td>
</tr>
<tr>
<td>2007-2012</td>
<td>4</td>
<td>34</td>
<td>55m</td>
<td>0</td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Ballybeg Lough

5. CONDITION ASSESSMENT

5.1 Population Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Density</td>
<td>At least 5 samples on Transects 1 and 2 should have &gt;10 V. moulinsiana individuals</td>
<td>No samples with &gt;10 individuals</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in at least 75% of samples on Transects 1 (min 10 samples) and 2 (min 4 samples)</td>
<td>Present in 43% of samples (5 out of 10 on Transect 1, 1 out of 4 on Transect 2)</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>3</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in at least 50% of samples on Transects 3 and 4 (minimum 10 samples on each)</td>
<td>Present in 55% of samples (8 out of 10 on Transect 3, 3 out of 10 on Transect 4)</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Density</td>
<td>At least 5 samples on Transects 1 and 2 should have &gt;10 V. moulinsiana individuals</td>
<td>7 samples with &gt;10 individuals</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in at least 75% of samples on Transects 1 (min 10 samples) and 2 (min 4 samples)</td>
<td>Present in 100% of samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>3</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in at least 50% of samples on Transects 3 and 4 (minimum 10 samples on each)</td>
<td>Present in 59% of samples</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2 Habitat Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>Over 80% of the samples on all transects are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>91% of samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat quality</td>
<td>Over 80% of the samples on all transects fall within soil moisture classes 3-5</td>
<td>94% of samples</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Spot Samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring period 2013-2018 (3 samples)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>01</td>
<td>R 33743 74247</td>
<td>13</td>
<td>5</td>
<td>18</td>
<td>IV</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>02</td>
<td>R 33755 74282</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>IV</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>03</td>
<td>R 33704 74363</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>IV</td>
<td>3</td>
<td>Optimal</td>
</tr>
</tbody>
</table>

In the monitoring period 2007-2012, Vertigo moulinsiana was recorded at 29 out of 41 sample locations along the four transects (71%), resulting in a Population Assessment of Favourable (green). In the current survey, 17 out of 34 locations along the transects were positive (50%), with the abundances recorded being much lower than the previous survey. Three spot samples taken in Polygon B in 2015 were all positive. Based on the criteria of Moorkens & Killeen (2011), and because of the reduced numbers on the transect, the Population Assessment for Ballybeg Lough is Unfavourable Inadequate (amber).

In the monitoring period 2007-2012, the snail is widespread in its distribution within the suitable habitat and is locally frequent.

5.2.2 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>Over 80% of the samples on all transects are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>91% of samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat quality</td>
<td>Over 80% of the samples on all transects fall within soil moisture classes 3-5</td>
<td>94% of samples</td>
<td>Pass</td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Ballybeg Lough

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A04.03</td>
<td>abandonment of pastoral systems, lack of grazing</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>25%</td>
<td>Cattle no longer grazing - last 5 years</td>
</tr>
<tr>
<td>2013-2018</td>
<td>A10.01</td>
<td>removal of hedges and copses or scrub</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>1%</td>
<td>Clearance</td>
</tr>
<tr>
<td>2013-2018</td>
<td>E03.03</td>
<td>disposal of inert materials</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>1%</td>
<td>Some infilling with rock/soil</td>
</tr>
<tr>
<td>2013-2018</td>
<td>K02.01</td>
<td>species composition change</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>25%</td>
<td>Alder, willow, ash scrub</td>
</tr>
<tr>
<td>2013-2018</td>
<td>L08</td>
<td>inundation (natural processes)</td>
<td>Inside</td>
<td>-</td>
<td>Neutral</td>
<td>100%</td>
<td>Floods every year - Farmer information</td>
</tr>
<tr>
<td>2007-2012</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Neutral</td>
<td>&lt;2ha</td>
<td>The cattle grazing has very little impact on the V. moulinsiana habitat and therefore the impact is neutral.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.01</td>
<td>temperature changes (e.g. rise of temperature &amp; extremes)</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>&lt;2ha</td>
<td>Given the susceptibility of the site to flooding, future potential impacts from climate change are likely to be negative. However, rising water levels, to some extent, may result in the suitability of currently marginal habitat elsewhere becoming suitable.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.02</td>
<td>droughts and less precipitations</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>&lt;2ha</td>
<td></td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.03</td>
<td>flooding and rising precipitations</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>&lt;2ha</td>
<td></td>
</tr>
</tbody>
</table>

Mon. period Future Prospects Notes

2013-2018 The Future Prospects for Ballybeg Lough for the 2007-2012 monitoring period were assessed as Favourable (green). A number of activities and impacts occur at the site that may affect its ability to support Vertigo moulinsiana into the future.
Vertigo moulinsiana monitoring at Ballybeg Lough

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Amber</td>
<td>Green</td>
<td>Green</td>
<td>Amber</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

Discussion:

The Overall Conservation Assessment for Ballybeg Lough in the monitoring period 2007-2012 was Favourable (green), but this has dropped to Unfavourable Inadequate (amber) for the current monitoring period (2013-2018) due to a drop in the number of positive samples, and also the number of individuals recorded, along the transects. The reason for this drop is unclear, as suitable vegetation is still present, and the wetness continues to be favourable. It may be, therefore, that the apparent drop in the Vertigo moulinsiana population is due to natural variation in the population. The habitat polygons at the site have been assessed as the same or better quality than the previous monitoring period, and this, along with the lack of major threats, has resulted in favourable Future Prospects. Polygon A is likely to benefit from intermittent grazing to prevent scrubbing over, with no management currently required for Polygon B, which is wet and supports abundant tall sedge and reed habitat.

Monitoring recommendations:

Given the fact that the site has dropped from Favourable (green) to Unfavourable Inadequate (amber), it is recommended that monitoring is carried out at three-yearly intervals. Monitoring should follow that of Moorkens & Killeen (2011), with some additions:

- Repeat Transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Repeat Transect 2, as above, minimum 4 samples
- Repeat Transect 3, as above, minimum 10 samples
- Repeat Transect 4, as above, minimum 10 samples
- Take at least 2 samples in the most suitable habitat in Polygon B and analyse for molluscan composition
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:

It is recommended that limited non-intensive cattle grazing be reintroduced in Polygon A in order to slow down the effects of succession, though at a level that does not impact vegetation and habitat supporting Vertigo moulinsiana. There is no evidence of management in Polygon B, but the habitat does not appear to require any management at this time. As this site is very close to a major urban centre (Ennis), and is not part of an SAC, it should be flagged as being of high conservation importance with the relevant authorities (especially Clare County Council) immediately by the NPWS. No development should be allowed in or near the site that might impact on the Vertigo moulinsiana habitat.
Vertigo moulinisiana monitoring at Ballybeg Lough

2007-2012

Area of occupancy:  Ballybeg Lough lies 2km to the south of Ennis. The V. moulinisiana habitat is at the northern end of the lake. Access is across private land from the R473 road to Labasheeda.

Discussion:
Ballybeg Lough is a good site for Vertigo moulinisiana. Although restricted to a narrow zone of marginal swamp, optimal and sub-optimal habitat occurs over at least 300m of the lake margin. The snail is present in good numbers over a relatively wide area, and there appear to be few imminent threats.

The Vertigo moulinisiana habitat is maintained by its high groundwater table and by inundation of the lake water at wet times of year. The low level of grazing has led to a build up of deep litter which rises above the inundation at times of year when the snails are at litter level. During active periods, the snails are in humid conditions high on the stems of the swamp vegetation. The site would be vulnerable to long term hydrogeological changes, and any water abstraction from the lake or other change that would result in a lowering of the groundwater table at any time of year.

Monitoring recommendations:
Given the Favourable Condition of the site, it is recommended that monitoring is carried out at 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2012
Methods (see Section 4 of main report for full details). Prescription as follows:
- Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinisiana (adult & juvenile) and other molluscs, minimum 10 samples
- Repeat transect 2, as above, minimum 4 samples
- Repeat transect 3, as above, minimum 10 samples
- Repeat transect 4, as above, minimum 10 samples
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinisiana
- Use results to determine overall condition assessment

Management recommendations:
Existing Management

The site is subject to some cattle grazing which could become a problem if it the intensity was increased.

Proposed management prescription for site

No change recommended. The non-intensive cattle grazing should continue at the present rates.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM08  County: Westmeath
SAC Site Code: n/a  Not in SAC

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>21 September 2015</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>9 September 2009</td>
<td>Ian Killeen &amp; Maria Long</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

The lake and its surrounding wetland communities are arranged in distinct zones across a hydrological transition. They include open water, reedswamp, tall sedge, alkaline fen, fen and willow scrub. EU habitats present at Vertigo moulinsiana habitat are Alkaline fens: low sedge-rich communities (Annex I Habitat 7230), rich fens of CORINE 54.2 and fen-sedge beds of CORINE 53.3 (Romão, 1996; Devillers et al., 1991), Calcareous Fen with Cladium mariscus (HD Annex I Habitat 7210; CORINE 53.3). Principal habitats at the site include Cladium mariscus beds, water fringe vegetation: reedbeds and large sedge communities e.g. Glyceria maxima swamp, Carex elata swamp, Typha/Phragmites beds, most communities of Corine 53 (water-fringe vegetation). In small transition areas of lower and more tightly cropped sward at the southern side of the lake, the habitat falls into the Rodwell M10 Pinguiculo-Caricetum dioicae Caricion davallianae group, characteristically being distinguished by Carex viridula, C. panicea, Parnassia palustris, Pinguicula vulgaris. They fall within the more general habitat of rich fen and flush (PF1) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Tall Carex species, Cladium mariscus
Class II: Phragmites australis, Polygonum persicaria, Equisetum fluviatile, Typha angustifolia, Sparganium erectum
Class III: Epilobium hirsutum, Menyanthes trifoliata, Mentha aquatica
Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

The Overall Conservation Assessment for Cappankelly has dropped from Favourable (green) in the 2007-2012 monitoring period to Unfavourable Inadequate (amber) for the current monitoring period (2013-2018). This drop is due to the fact that fewer Vertigo moulinsiana individuals were recorded in the samples on the transect (criterion: >20 individuals in at least 12 samples). As the habitat and Future Prospects remain good, the drop in the Population Assessment may be the result of natural fluctuations in the snail’s population, rather than reflecting a real decline. Further surveys at this site will help elucidate this. There is currently no requirement for a change to the management of the site, though scrub encroachment may be an issue in the future. It should be noted that this site floods to quite a depth some years (evident in aerial photographs). This is likely to help control scrub, but does not appear to be having a large impact on the target species, as evidenced by its continued widespread presence at the site.

3. Transect Details

<table>
<thead>
<tr>
<th>Transect</th>
<th>Monitoring period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transect: 1</td>
<td>2013-2018</td>
</tr>
</tbody>
</table>

Start point: N 06183 44799  Lake margin
End point: N 06253 44773  Lake margin
Transact length: 85
Direction: W-E
Description: Lake margin with tall sedges and Cladium mariscus. Transect in Moorkens & Killeen (2011) report was given as 'approx. 85m'; 95m shown below is error in database.

Sampling frequency: Ten samples were taken at approximately 10m intervals
Vertigo moulinsiana monitoring at Cappankelly

4. RESULTS

Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Monitoring Period: 2013-2018</th>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Optimal-Suboptimal</td>
<td>0.2236</td>
<td>Polygon A status remains Optimal-Suboptimal. Area of mixed vegetation - grades from wet grassland, to a sedge-dominated sward, to swamp near the water’s edge. This area floods some years (seen from aerial photos, and on previous site visit).</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Optimal</td>
<td>0.194</td>
<td>Polygon B status remains Optimal. Strip of tall wetland vegetation with line of scrub (mostly Salix cinerea subsp. oleifolia).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring Period: 2007-2012</th>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Sub-optimal with optimal areas</td>
<td>0.224</td>
<td>Polygon A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Optimal</td>
<td>0.189</td>
<td>Polygon B</td>
<td></td>
</tr>
</tbody>
</table>

Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>1</td>
<td>01a; 0m</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>2</td>
<td>01b; 0m</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>3</td>
<td>01c; 0m</td>
<td>8</td>
<td>4</td>
<td>12</td>
<td>1</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>4</td>
<td>02a; 10m</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>5</td>
<td>02b; 10m</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>6</td>
<td>02c; 10m</td>
<td>9</td>
<td>0</td>
<td>9</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>7</td>
<td>03a; 20m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>8</td>
<td>03b; 20m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>9</td>
<td>03c; 20m</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>10</td>
<td>04a; 30m</td>
<td>10</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>11</td>
<td>04b; 30m</td>
<td>20</td>
<td>0</td>
<td>20</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>12</td>
<td>04c; 30m</td>
<td>10</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>13</td>
<td>05a; 40m</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>14</td>
<td>05b; 40m</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>15</td>
<td>05c; 40m</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>1</td>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>16</td>
<td>06a; 50m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>17</td>
<td>06b; 50m</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>2013-2018</td>
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<td>19</td>
<td>07a; 60m</td>
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<td>07c; 60m</td>
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<td>1</td>
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</table>
## Vertigo moulinsiana monitoring at Cappankelly

### Monitoring period 2007-2012 Transect 1 (24 samples)

<table>
<thead>
<tr>
<th>Year</th>
<th>Mon.</th>
<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
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<tbody>
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<td>2007</td>
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<td>#10a</td>
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<td>#10b</td>
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<td>Optimal</td>
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<td>Optimal</td>
</tr>
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<td>5</td>
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<td>Optimal</td>
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<td>2007</td>
<td>1</td>
<td>#18b</td>
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<td>67</td>
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<td>2007</td>
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<td>#19a</td>
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<td>5</td>
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<td>Optimal</td>
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<tr>
<td>2007</td>
<td>1</td>
<td>#20b</td>
<td>N06253 44773</td>
<td>19</td>
<td>38</td>
<td>57</td>
<td>5</td>
<td>I</td>
<td>Optimal</td>
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</table>

### Spot Samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
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</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>01a</td>
<td>N06228</td>
<td>0</td>
<td>0</td>
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<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>01b</td>
<td>N06228</td>
<td>0</td>
<td>0</td>
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<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
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<td>2013-2018</td>
<td>02a</td>
<td>N06217</td>
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<td>0</td>
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<td>I</td>
<td>4</td>
<td>Optimal</td>
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</table>
Vertigo moulinsiana monitoring at Cappankelly

5. CONDITION ASSESSMENT

5.1 Population Assessment: 2 passes Favourable (green); 1 pass Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Density</td>
<td>12 samples (= 50% of minimum 24 samples) contain at least 20 adult and juvenile snails</td>
<td>1 sample with &gt;20 individuals</td>
<td>Fail</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Presence/Absence</td>
<td>Vertigo moulinsiana is present in 75% of samples (minimum 24 samples) on the Transect</td>
<td>Present in 79% of samples (all 8 locations positive, with 19 of 24 individual samples positive)</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Density</td>
<td>12 samples (= 50% of minimum 24 samples) contain at least 20 adult and juvenile snails</td>
<td>16 samples with &gt;20 individuals</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 75% of samples (minimum 24 samples) on the Transect</td>
<td>present in 24 samples</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Mon. period Population Notes

2013-2018 In the 2007-2012 monitoring period, Vertigo moulinsiana was recorded at 18 out of 21 locations and in 35 out of 45 individual samples. All 24 samples (at 11 locations) taken on Transect 1 were positive, with good numbers of Vertigo moulinsiana. In the current survey, Vertigo moulinsiana was recorded at 8 out of 10 locations overall, and 19 out of 24 individual samples taken on Transect 1 were positive for the species (though generally in lower numbers than the previous survey). Two locations (with two samples each) were sampled in Polygon A in 2015, with one sample being positive. This compares to 21 samples in total (from 10 locations) sampled in 2009, of which 11 samples were positive. Based on the criteria of Moorkens & Killeen (2011), and because of the dearth of samples with >20 individuals on the transect, the...
Vertigo moulinsiana monitoring at Cappankelly

5.2 Habitat Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>24 samples on the Transect are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>24 samples suitable</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat quality</td>
<td>24 samples on the Transect fall within soil moisture classes 3-5</td>
<td>24 samples suitable</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat extent</td>
<td>24 samples on the Transect are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>24 samples suitable</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat quality</td>
<td>24 samples on the Transect fall within soil moisture classes 3-5</td>
<td>24 samples suitable</td>
<td>Pass</td>
</tr>
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</table>

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>Potentially suitable habitat exists along the southern margins of the lake from N06183 44799 to N06274 44779</td>
<td>Yes. 0.19ha Optimal habitat in Polygon B</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>Potentially suitable habitat exists along the southern margins of the lake from N06183 44799 to N06274 44779</td>
<td>Yes</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Mon. period | Habitat Notes

2013-2018 | The 2007-2012 monitoring period survey delineated two habitat polygons supporting Vertigo moulinsiana, and in the current survey, these polygons were found to be unchanged in status, with suitable vegetation and ground moisture recorded. Based on the criteria of Moorkens & Killeen (2011), the Habitat Assessment for Cappankelly is Favourable (green).

2007-2012 | Although good V. moulinsiana habitat is restricted, it is in good condition,

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>50%</td>
<td>Grazing and trampling along edges</td>
</tr>
<tr>
<td>2013-2018</td>
<td>K02.01</td>
<td>species composition change</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>35%</td>
<td>Salix cinerea subsp. oleifolia &amp; others</td>
</tr>
<tr>
<td>2013-2018</td>
<td>L08</td>
<td>inundation (natural processes)</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>100%</td>
<td>Site floods completely some years as seen on APs</td>
</tr>
<tr>
<td>2007-2012</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Neutral</td>
<td>&lt;1ha</td>
<td>The cattle grazing has very little impact on the V. moulinsiana habitat and therefore the impact is neutral.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.01</td>
<td>temperature changes (e.g. rise of temperature &amp; extremes)</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>&lt;1ha</td>
<td>Given the susceptibility of the site to flooding, future potential impacts from climate change are likely to be negative.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.02</td>
<td>droughts and less precipitations</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>&lt;1ha</td>
<td></td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.03</td>
<td>flooding and rising precipitations</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>&lt;1ha</td>
<td></td>
</tr>
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</table>
Vertigo moulinsiana monitoring at Cappankelly

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Amber</td>
<td>Green</td>
<td>Green</td>
<td>Amber</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: This small un-named lough lies between the townland of Cappankelly and Friar’s Island. Access is from the minor road and then track which runs from Ballykeeran (N074442) to Friar’s Island.

Discussion:
The Overall Conservation Assessment for Cappankelly has dropped from Favourable (green) in the 2007-2012 monitoring period to Unfavourable Inadequate (amber) for the current monitoring period (2013-2018). This drop is due to the fact that fewer Vertigo moulinsiana individuals were recorded in the samples on the transect (criterion: >20 individuals in at least 12 samples). As the habitat and Future Prospects remain good, the drop in the Population Assessment may be the result of natural fluctuations in the snail’s population, rather than reflecting a real decline. Further surveys at this site will help elucidate this. There is currently no requirement for a change to the management of the site, though scrub encroachment may be an issue in the future. It should be noted that this site floods to quite a depth some years (evident in aerial photographs). This is likely to help control scrub, but does not appear to be having a large impact on the target species, as evidenced by its continued widespread presence at the site.

Monitoring recommendations:
Given the apparent drop in the population at this site, it is recommended that monitoring is carried out at three-yearly intervals. Monitoring should follow that set out in Moorkens & Killeen (2011), with one addition, as listed below:

- Repeat Transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 24 samples
- Take at least 2 samples in at least two locations in the most suitable habitat in Polygon A
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
The site is currently subject to non-intensive cattle grazing, but at a level that is not negatively impacting on the Vertigo moulinsiana habitat, and so no change is recommended at this time. The potential exists for scrubbing over by Salix spp. and this should be monitored and action taken if shading starts to become a problem.
Vertigo moulinisiana monitoring at Cappankelly

2007-2012

**Area of occupancy:** This small un-named lough lies between the townland of Cappankelly and Friar’s Island. Access is from the minor road and then track which runs from Ballykeeran (N074442) to Friar’s Island.

**Discussion:**
This is a small site with a rather small amount of habitat (less than 200m² optimal). However, it is in good condition with a strong V. moulinisiana population. There are few threats but it is subject to frequent inundation, and, therefore, it is especially vulnerable in the longer term to potential effects of climate change.

The Vertigo moulinisiana habitat is maintained by its high groundwater table and by inundation of the lake water at wet times of year. The lack of grazing has led to a build up of deep litter which rises above the inundation at times of year when the snails are at litter level. During active periods, the snails are in humid conditions high on the stems of the swamp vegetation. The site would be vulnerable to long term hydrogeological changes, and any water abstraction from the lake or other change that would result in a lowering of the groundwater table at any time of year.

**Monitoring recommendations:**
Given the Favourable Condition of the site, it is recommended that monitoring is carried out at 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2012

Methods (see Section 4 of main report for full details). Prescription as follows:
- Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinisiana (adult & juvenile) and other molluscs, minimum 24 samples
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinisiana
- Use results to determine overall condition assessment

**Management recommendations:**

Existing Management

The site is subject to some cattle grazing which could become a problem if the intensity was increased.

Proposed management prescription for site

No change recommended
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM09  County: Westmeath
SAC Site Code: n/a  Not in SAC

1.2 General Habitat Description (from baseline survey):

The lake and its surrounding wetland communities are arranged in discontinuous but often distinct zones across a hydrological transition. They include open water, reedswamp, tall sedge, alkaline fen, fen-Iris marsh to grassland transition and bog. The general habitat in which Vertigo moulinsiana is present at Waterstown Lough is Calcareous Fen (HD Annex I Habitat 7230; CORINE 54.2), Calcareous Fen with Cladium mariscus (HD Annex I Habitat 7210; CORINE 53.3), petrifying springs with tufa formation (HD Annex I Habitat 7220; CORINE 54.12), ditch and waterside communities including most communities of CORINE 53 (Romão, 1996; Devillers et al., 1991). Principal habitats at the site include water fringe vegetation: reedbeds and large sedge communities e.g. Typha/Phragmites beds, most communities of Corine 53 (water-fringe vegetation), especially: common reed beds, dry Phragmites beds (53.112), reedmace beds (53.13), medium-tall waterside communities (53.14). The specific areas that are within a wider mosaic, but that form specific V. moulinsiana habitat fit the Cladium and Schoenus communities of M13, and the tall Carex M9 Rodwell characteristic vegetation classification (Rodwell, 1991). In transition areas at the northern end of the site, the habitat falls into the Rodwell M10 Pinguiculc-Caricetum dioicae Caricion davallianae group, characteristically being distinguished by Carex viridula, C. panicea, Parnassia palustris, Campylomy stellatum, Pinguicula vulgaris, Selaginella selaginoides, and Drepanocladus revolvens. These communities merge into one another with throughout the habitat. They fall within the more general habitat of rich fen and flush (PF1) of Fossitt (2000).

3. SUMMARY:

Waterstown Lough is a very important site, as it supports all three Annex II Vertigo species (Vertigo angustior, Vertigo geyeri and Vertigo moulinsiana); one of only two sites to do so in Ireland, the other being Pollardstown Fen. The site has dropped from Favourable (green) to Unfavourable Bad (red) in the current monitoring round for Vertigo moulinsiana. This is due to a dramatic drop in the abundance of this species at the site. It is unclear what has caused this drop, given that there appears to be extensive suitable habitat, and no obviously severe impacts were noted. The reduction in the Vertigo moulinsiana population at the site may be due to natural fluctuations in the population, or it may be the case that some subtle change has taken place at the site. None of the activities identified at the site (e.g. cattle grazing, water abstraction at springs, etc.) are considered sufficient to cause such a widespread negative effect on the Vertigo moulinsiana population at the site. The possibility that natural succession processes, leading to drying as the lake infills, cannot be ruled out; however, all areas with potential for Vertigo moulinsiana appear adequately wet.

If focus is shifted a little wider, land use in the surrounding area includes turf cutting and drainage on the raised bog to the west and south of the site, and forestry and its associated works to the north-west and south-east. Research is needed to ascertain if any of these activities may be resulting in changes to the water chemistry (e.g. becoming more acid), water quality (e.g. increased siltation) or hydrological/flooding regime (e.g. lowering of water table) of Waterstown Lough. Extreme care is needed in terms of any activities in the vicinity of this site (e.g. further turf-cutting, drainage or forestry plantings). These activities need to be carefully monitored, and further/new works should not be permitted. This site is currently designation as a pNHA (Waterstown Lake pNHA, 001732), but should be considered for SAC status based on the occurrence of all three Vertigo species.

3. TRANSECT DETAILS

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4. RESULTS

Polygon habitat characteristics

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**Monitoring Period:** 2007-2012

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Vertigo moulinsiana monitoring at Waterstown Lough

5. CONDITION ASSESSMENT

5.1 Population Assessment:  2 passes Favourable (green); 1 pass Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

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<th>Mon. period</th>
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<th>Result</th>
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<th>Mon. period</th>
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<th>Pass/Fail</th>
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<tr>
<td>2013-2018</td>
<td>Density</td>
<td>25% of the samples (from a minimum of 45 samples) should have over 20 individuals</td>
<td>No samples with &gt;20 individuals</td>
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<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in samples from at least 10 separate locations (minimum 45 samples from 15 locations with a geographical spread)</td>
<td>Present in 7 out of 20 sample sites (11 out of 60 individuals samples)</td>
<td>Fail</td>
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<tr>
<td>2007-2012</td>
<td>Density</td>
<td>25% of the samples (from a minimum of 45 samples) should have over 20 individuals</td>
<td>11 of the 38 samples have &gt;20 individuals</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in samples from at least 10 separate locations (minimum 45 samples from 15 locations with a geographical spread)</td>
<td>Present in 16 out of 18</td>
<td>Pass</td>
</tr>
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</table>

2013-2018    | Population Notes | In the survey conducted in 2009 as part of the 2007-2012 monitoring period, Vertigo moulinsiana was recorded at 17 out of 18 locations (and in 32 out of 38 samples, or 84%), with good numbers present throughout. The Population Assessment was determined to be Favourable (green). In the current survey, Vertigo moulinsiana was recorded from 7 out of 20 locations (and in 11 out of 60 samples, or 18%) and in very low numbers (typically 1-2 juveniles only). These positive locations were, however, quite widely spread across the north, north-eastern and central portions of the site. Based on the criteria of Moorkens & Killeen (2011), the Population Assessment for Waterstown Lough is Unfavourable Bad (red).

2007-2012    | the snail is widespread in its distribution and is locally common

5.2 Habitat Assessment:  3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

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5.2.2 Site level

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<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>Over 4 ha of the northern part of the</td>
<td>4.3ha Optimal-</td>
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### 5.3 Future Prospects Assessment

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<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
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<td>2013-2018</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>30%</td>
<td>Grazing at edges reducing vegetation height</td>
</tr>
<tr>
<td>2013-2018</td>
<td>D03.01.02</td>
<td>piers / tourist harbours or recreational piers</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>1%</td>
<td>Small, old boat jetty. Two small boats.</td>
</tr>
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<td>2013-2018</td>
<td>F06.01</td>
<td>game/ bird breeding station</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>1%</td>
<td>Pheasantry at north end of site</td>
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<tr>
<td>2013-2018</td>
<td>J02.07</td>
<td>Water abstractions from groundwater</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>5%</td>
<td>Very difficult to assess what effect, if any, this water abstraction is having on the site. Site appears sufficiently wet.</td>
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<td>2013-2018</td>
<td>K01.03</td>
<td>Drying out</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>100%</td>
<td>Site may be drying out as reeds fill the lake</td>
</tr>
<tr>
<td>2007-2012</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>&lt;1ha</td>
<td>The lack of grazing (A04.03) refers to a small part of polygon area A where the landowner has recently fenced off part of the Schoenus dominated habitat. Already this has led to a spread of Rhododendron in the area. In the medium to long term the habitat in this area is likely to become less suitable, but in terms of the overall site, it will have little impact.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>A04.03</td>
<td>abandonment of pastoral systems, lack of grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>&lt;1ha</td>
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**Future Prospects Notes**

The Future Prospects for Waterstown Lough in the monitoring period 2007-2012 were assessed as Favourable (green).
Vertigo moulinsiana monitoring at Waterstown Lough

### Population assessment

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<td>2013-2018</td>
<td>the current survey, a number of activities and impacts were noted at this site that could potentially affect its suitability for Vertigo moulinsiana. Non-intensive cattle grazing has resulted in a reduction in vegetation height along the edges of the reedbeds in part of the site. The pheasantry and the jetty have resulted in some loss of habitat. In terms of the hydrology, which is critical at this site as with other wetlands, the site may be drying out as the lake infills and reeds extend their range into the lake (for example, the six-inch map from the early 1900s shows a much larger area of open water than that which occurs today). However, all areas with potential for Vertigo moulinsiana were adequately wet for the species at the time of survey. Water abstraction is occurring to provide water for a house adjacent to the site, but is likely to have only a localised effect. None of these impacts appear widespread in their effects, or serious in their intensity, and so the Future Prospects for Waterstown Lough are considered to be Favourable (green).</td>
</tr>
<tr>
<td>2007-2012</td>
<td>As the impact is low rather than severe, Future prospects have been assessed as Favourable</td>
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### Overall Notes

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<td>2013-2018</td>
<td>While the Habitat Assessment and Future Prospects for Waterstown Lough have returned a Favourable (green) result, the Unfavourable Bad (red) Population Assessment results in an Overall Assessment of Unfavourable Bad (red).</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Waterstown Lough is a very good site for Vertigo moulinsiana. Optimal habitat occurs over an area of at least 16ha and possibly more. The snail is present in good numbers over a wide area, and there appear to be few imminent threats.</td>
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</tbody>
</table>

### 5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Red</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
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</tbody>
</table>

### 6. DISCUSSION

**Monitoring period**

2013-2018

**Area of occupancy:** Waterstown Lough lies to the east of the southern end of Lough Ree, approximately 5km north-east of Athlone. Access to the main sample site is along a private track off the main track from N105458.

**Discussion:**

Waterstown Lough is a very important site, as it supports all three Annex II Vertigo species (Vertigo angustior, Vertigo geyeri and Vertigo moulinsiana); one of only two sites to do so in Ireland, the other being Pollardstown Fen. The site has dropped from Favourable (green) to Unfavourable Bad (red) in the current monitoring round for Vertigo moulinsiana. This is due to a dramatic drop in the abundance of this species at the site. It is unclear what has caused this drop, given that there appears to be extensive suitable habitat, and no obviously severe impacts were noted. The reduction in the Vertigo moulinsiana population at the site may be due to natural fluctuations in the population, or it may be the case that some subtle change has taken place at the site. None of the activities identified at the site (e.g. cattle grazing, water abstraction at springs, etc.) are considered sufficient to cause such a widespread negative effect on the Vertigo moulinsiana population at the site. The possibility that natural succession processes, leading to drying as the lake infills, cannot be ruled out; however, all areas with potential for Vertigo moulinsiana appear adequately wet.

If the focus is shifted a little wider, land use in the surrounding area includes turf cutting and drainage on the raised bog to the west and south of the site, and forestry and its associated works to the north-west and south-east. Research is needed to ascertain if any of these activities may be resulting in changes to the water chemistry (e.g. becoming more acid), water quality (e.g. increased siltation) or hydrological/flooding regime (e.g. lowering of water table) of Waterstown Lough. Extreme care is needed in terms of any activities in the vicinity of this site (e.g. further turf-cutting, drainage or forestry plantings). These activities need to be carefully monitored, and further/new works should not be permitted. This site is currently designation as a pNHA (Waterstown Lake pNHA, 001732), but should be considered for SAC status based on the occurrence of all three Vertigo species.

**Monitoring recommendations:**

Due to the drop in status from Favourable to Unfavourable Bad, it is recommended that monitoring of Waterstown Lough is carried out at a minimum of two-yearly intervals, particularly because of its almost unique status in supporting all three protected Vertigo species. This should be re-assessed in light of any further deterioration of condition or any changes to site management. Monitoring should follow that of Moorkens & Killeen (2011), with just a minor alteration, as shown below:

- Take 3 samples at each from at least 15 locations with optimal habitat, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples. At least two samples to be from Polygon B.
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal- Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

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- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment
Management recommendations:

The main form of land management in Polygon A is non-intensive cattle grazing. At this site, the needs of all three Vertigo species need to be balanced. While cattle may poach Vertigo geyeri habitat, they are crucial in maintaining it open. Cattle tend to be less necessary in Vertigo moulinsiana habitat, and if levels are high, they can graze or trample vegetation so that it becomes too low. At this site however, while both effects mentioned above were seen in places, the balance is about right. Thus it is recommended that the status quo be maintained.

There is little management taking place in Polygon B, apart from minor vegetation clearance along small, rough tracks for access for shooting. This is very small scale and not seen to be detrimental. Again, the status quo should remain.

As noted in the discussion section, the answer to the decrease in Vertigo moulinsiana numbers MAY come from land management outside this site, relating to turf-cutting and/or forestry plantations. These activities need to be carefully monitored, and further/new works should not be permitted.

2007-2012

Area of occupancy: Waterstown Lough lies to the east of the southern end of Lough Ree, approximately 5km north-east of Athlone. Access to the main sample site is along a private track off the main track from N105458.

Discussion:

Of particular interest was the discovery of Vertigo geyeri, V. angustior and Pupilla pratensis. Waterstown Lough is one of only 2 known sites in Ireland where all 3 Annex II Vertigo species are known (Pollardstown Fen is the other). Vertigo geyeri occurred in good numbers in the samples. However, the calcareous flush habitat is vulnerable as it is trampled by cattle. Two individuals of V. angustior were retrieved from sample 21 which was taken higher up the flush slope nearer the transition into Iris habitat. It is more likely that the Iris transition is its principal habitat at the site.

Waterstown Lough is one of only 2 known sites in Ireland for Pupilla pratensis (the other is Clonaslee Eskers, Co Laois). It was first recognised in Ireland at Clonaslee having previously been recorded as P. muscorum. The species occurs in the transition zone between the botanically diverse spring seepage with some patches of tufa formation and the wet Iris and Potentilla anserina grassland transition. Pupilla pratensis appears to be a rare species in Ireland as no other sites have been located during extensive studies of similar habitats as part of this Vertigo SAC monitoring programme for National Parks & Wildlife or during other surveys of suitable habitats.

Monitoring recommendations:

Although the site is in good condition for Vertigo moulinsiana in terms of distribution and abundance, it is recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2012

Methods (see Section 4 of main report for full details). Prescription as follows:
- Take 3 samples at each from at least 15 locations with optimal habitat, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

This site is of high importance. It is strongly recommended that surveys to assess the status of Vertigo geyeri and V. angustior are instigated as soon as possible.

Management recommendations:

Existing Management

The northern end of the site (i.e. that with the 3 Vertigo species) is in private ownership. There are cattle in the lake margins and there was some poaching of the calcareous springs, which is likely to affect V. geyeri rather than V. moulinsiana at the site. One area has been fenced off for pheasant rearing. There is also some management of the marginal vegetation for wildfowl rearing (or shooting).

Proposed management prescription for site

Given the importance of the site, it is recommended that cattle are managed in a way that is protective to the spring habitats, and are moved away through temporary electric fencing or other enclosure partition when the springs are vulnerable to trampling (very wet conditions where damage is likely to be high or very dry conditions where the cattle may preferentially graze along the spring line). Cattle numbers should not be increased in density, and supplementary feeding should not occur within the important habitat areas mentioned above. The habitat area should not be drained or fertilised. As the management has been non-intensive to date, this is essentially maintenance of the status quo.
Vertigo moulinsiana monitoring at Ballynafagh Bog

1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM10  County: Kildare
SAC Site Code: 000391  Ballynafagh Bog

1.2 General Habitat Description (from baseline survey):

The general habitat in which Vertigo moulinsiana is present at Ballynafagh Lake and the Blackwood Feeder is a low lying area of swamp fen. The EU habitats that this relates to are Alkaline Fen (Annex I 7230), water fringe vegetation comprising medium-tall waterside communities (CORINE 53.14) and reed sweetgrass beds (CORINE 53.16) with some rich fen characteristics (CORINE 54.2) (Romão, 1996; Devillers et al., 1991). The snail is widespread around the lake margins, becoming less dense as habitat becomes drier away from the lake. It is found in parts of the dried canal feeder that still have some spring or water input, and maintain swamp conditions. It was mainly found on Carex paniculata, Carex riparia, Glyceria maxima, Phalaris arundinacea, and Iris pseudacorus, and Phragmites australis. The water table was above ground surface level in the best V. moulinsiana habitats. V. moulinsiana is also found in a swampy ditch dominated by tall carices and Sparganium erectum on the north side of the Grand Canal, west of Bonynge Bridge. The specific areas that are within a wider mosaic, but that form specific V. moulinsiana habitat fit the Filipendula mire of the M27 and the tall Carex M9 Rodwell characteristic vegetation classification (Rodwell, 1991). This falls within the more general habitat of rich fen and flush (PF1), reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I:
- Tall Carex species, Glyceria maxima, Typha angustifolia, Sparganium erectum

Class II:
- Phragmites australis, Cladium mariscus, Carex rostrata, Equisetum fluviatile

Class III:
- Filipendula ulmaria, Epilobium hirsutum, Menyanthes trifoliata, Mentha aquatica, Schoenus nigricans

Class IV:
- All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

As noted by Moorkens & Killeen (2011), this is an important site for Vertigo moulinsiana given the loss of the snail from other canal-side locations in Co. Kildare. This is a site which has seen a serious decline in recent years, and is in need of immediate and broad-ranging conservation actions if the species is to continue to survive there. The Overall Conservation Assessment for Ballynafagh Bog was Favourable (green) in the monitoring period 2007-2012 - there were very high numbers of Vertigo moulinsiana found across the site, and the habitat was deemed to be in good condition. The assessment result has dropped to Unfavourable Bad (red) for the current monitoring period (2013-2018). The population and habitat assessments have dropped to Unfavourable Bad (red), while the Future Prospects have dropped to Unfavourable Inadequate (amber). The decline in the population and habitat is considered to represent real decline (rather than interpretation or mapping issues), as the habitat has changed through drying out, vegetation change (e.g. succession, scrub encroachment) and heavy cattle-grazing (Polygon C). Actions required to improve the situation for Vertigo moulinsiana at Ballynafagh Bog include an overall strategic hydrological plan aimed at increasing, or at least maintaining, water levels across the site. Also needed is some targeted scrub removal, particularly at Transect 1, and a reduction in grazing in the Blackwater Feeder.

It is worth noting that the Population Assessment criteria in particular are set quite high at this site. Moorkens & Killeen (2011) mention that in 2006 numbers of Vertigo moulinsiana were much lower across the site than in 2010. It may be that 2010 was an exceptionally good year for the species, and that the population criteria should be reduced/relaxed somewhat. However, even should these changes be made, the site would still struggle to pass assessment due to habitat changes (and this will continue to affect the snail’s survival).

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT</th>
<th>MONITORING PERIOD</th>
<th>Start point</th>
<th>End point</th>
<th>Transect length</th>
<th>Direction</th>
<th>Description</th>
<th>Sampling frequency</th>
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<tr>
<td>1</td>
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<td>N 81205 28951</td>
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<td>N-S</td>
<td>Transect follows and old, shallow ditch. Has dried out and scrubbed over since 2007-2012</td>
<td>Six samples were taken at approximately 5m intervals</td>
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4. RESULTS

Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Suboptimal</td>
<td>10.2151</td>
<td>Polygon A status remains Suboptimal. This is a large area of lakeside habitat, and is quite variable in terms of quality and make up. Some areas are still quite wet, however some are drying and scrub encroachment is an issue.</td>
</tr>
<tr>
<td>B</td>
<td>Suboptimal</td>
<td>1.0157</td>
<td>Polygon B status drops from Optimal and sub-optimal, to Suboptimal due to drying out and a change in the vegetation. This is a low-lying area of tall sedge vegetation with some scrub.</td>
</tr>
<tr>
<td>C</td>
<td>Suboptimal-Unsuitable</td>
<td>0.4076</td>
<td>Polygon C status drops from Optimal and sub-optimal, to Suboptimal-Unsuitable due to drying out and heavy grazing. This is a stretch of abandoned canal bed. It is of variable wetness underfoot, and the vegetation varies also, with grazing and wetness impacting on vegetation composition (and particularly on occurrence of tall-growing species which Vertigo moulinsiana favours).</td>
</tr>
<tr>
<td>D</td>
<td>Optimal-Suboptimal</td>
<td>0.7263</td>
<td>Polygon D status drops from Optimal to Optimal-Suboptimal due to drying out. Habitat quite dry underfoot, and quite shaded.</td>
</tr>
</tbody>
</table>

Monitoring Period: 2007-2012

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Sub-optimal</td>
<td>10.21</td>
<td>Polygon A - Ballynafagh Lake – Sub-optimal, includes most of the suitable habitat around the lake margins</td>
</tr>
<tr>
<td>B</td>
<td>Sub-optimal with optimal areas</td>
<td>1.06</td>
<td>Polygon B - Ballynafagh Lake – Optimal and sub-optimal depression with sedge fen</td>
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<tr>
<td>C</td>
<td>Sub-optimal</td>
<td>0.41</td>
<td>Polygon C - Blackwood Feeder – Sub-optimal old canal bed</td>
</tr>
<tr>
<td>D</td>
<td>Optimal</td>
<td>0.73</td>
<td>Polygon D - Bonyne Bridge – Optimal swampy ditch</td>
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Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
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<th>Wetness</th>
<th>Habitat suitability</th>
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<td></td>
</tr>
<tr>
<td>2013-2018</td>
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<td>1</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>IV</td>
<td>3</td>
<td>Suboptimal-Unsuitable</td>
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</table>
Vertigo moulinsiana monitoring at Ballynafagh Bog

<table>
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<tr>
<th>Year</th>
<th>Transect</th>
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<th>Score</th>
<th>Class</th>
<th>Value</th>
<th>Score</th>
<th>Class</th>
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Monitoring period 2013-2018 Transect 2 (10 samples)

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Monitoring period 2007-2012 Transect 1 (11 samples)

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Monitoring period 2007-2012 Transect 2 (13 samples)

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Vertigo moulinsiana monitoring at Ballynafagh Bog

### Spot Samples

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Vertigo moulinsiana monitoring at Ballynafagh Bog

5. CONDITION ASSESSMENT

5.1 Population Assessment:  6 passes Favourable (green); 4-5 passes Unfavourable Inadequate (amber); 0-3 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
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<tbody>
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<td>Presence/Absence</td>
<td>Vertigo moulinsiana is present in 5 samples (or 50% of samples) on Transect 1 (minimum 10 samples)</td>
<td>Vertigo moulinsiana absent from Transect 1</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>04a</td>
<td>Presence/Absence</td>
<td>Vertigo moulinsiana is present in 5 samples (or 50% of samples) on Transect 1 (minimum 10 samples)</td>
<td>Vertigo moulinsiana absent from Transect 1</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>04b</td>
<td>Presence/Absence</td>
<td>Vertigo moulinsiana is present in 5 samples (or 50% of samples) on Transect 1 (minimum 10 samples)</td>
<td>Vertigo moulinsiana absent from Transect 1</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>04c</td>
<td>Presence/Absence</td>
<td>Vertigo moulinsiana is present in 5 samples (or 50% of samples) on Transect 1 (minimum 10 samples)</td>
<td>Vertigo moulinsiana absent from Transect 1</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>05a</td>
<td>Presence/Absence</td>
<td>Vertigo moulinsiana is present in 5 samples (or 50% of samples) on Transect 1 (minimum 10 samples)</td>
<td>Vertigo moulinsiana absent from Transect 1</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>05b</td>
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<td>Vertigo moulinsiana is present in 5 samples (or 50% of samples) on Transect 1 (minimum 10 samples)</td>
<td>Vertigo moulinsiana absent from Transect 1</td>
<td>Fail</td>
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<tr>
<td>2007-2012</td>
<td>05c</td>
<td>Presence/Absence</td>
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<td>Vertigo moulinsiana absent from Transect 1</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>06a</td>
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<tr>
<td>2007-2012</td>
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<tr>
<td>2007-2012</td>
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<tr>
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<td>2007-2012</td>
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<td>Presence/Absence</td>
<td>Vertigo moulinsiana is present in 5 samples (or 50% of samples) on Transect 1 (minimum 10 samples)</td>
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</table>

2013-2018

2013-2018

2013-2018

2007-2012

2007-2012
Vertigo moulinsiana monitoring at Ballynafagh Bog

### 5.2 Habitat Assessment:
#### 5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
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<td>2013-2018</td>
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<td>Habitat extent</td>
<td>Over 50% of the samples on Transect 1 are dominated by suitable vegetation (Classes I &amp; II) AND Over 80% of the samples on Transect 1 fall within soil moisture classes 3-5</td>
<td>0% of samples dominated by suitable vegetation AND 30% of samples with suitable moisture</td>
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<td>Habitat extent</td>
<td>Over 80% of the samples on Transect 2 are dominated by suitable vegetation (Classes I &amp; II) AND Over 80% of the samples on Transect 2 fall within soil moisture classes 2-4</td>
<td>60% of samples dominated by suitable vegetation AND 100% of samples with suitable moisture</td>
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### Population Notes

For Ballynafagh Lake (Polygons A and B) the results for 2007-2012 were:
- Transect 1 - Six out of 11 locations positive
- Transect 2 - Seven out of 13 locations positive
- Four out of five spot locations were positive (11/15 samples).

This compares to the following results from the current survey (2015):
- Transect 1 - No positive samples (6 locations, 10 samples in total)
- Transect 2 - Three out of 10 locations positive
- A single location at the southwestern end of Ballynafagh Lake was negative (2 samples).

For the Blackwood Feeder (Polygon C):
- Three out of four positive locations in 2010 (7/10 samples)
- All four locations sampled in 2015 were negative (0/11 samples).

For Bonynge Bridge (Polygon D):
- Four out of four positive locations (10/10 samples) in 2010.
- Four out of four positive locations (9/12 samples) in 2015.

Based on these results, and on the criteria of Moorkens & Killeen (2011), the Population Assessment for Ballynafagh Bog is Unfavourable Bad (red).

### Presence/Absence

- **2007-2012**
  - Presence/Absence: V. moulinsiana is present in 5 samples (or 50% of samples) on Transect 2 (minimum 10 samples)
  - Pass: Present in 7 samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
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<td>Adult or sub-adult snails are present in 3 of the 4 sample locations in the Blackwood Feeder</td>
<td>Vertigo moulinsiana absent from 4 locations sampled</td>
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<td>Species extent</td>
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<td>Present in all 4 locations</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Density</td>
<td>50% of the samples at Bonynge should have &gt;50 individuals (minimum 10 samples)</td>
<td>80% of samples with &gt;50 individuals</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in 3 of the 4 sample locations in the Blackwood Feeder</td>
<td>Present in 3 of the 4 locations</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Species extent</td>
<td>Adult or sub-adult snails are present in 3 of the 4 sample locations at Bonynge Bridge</td>
<td>Present in all 4 locations</td>
<td>Pass</td>
</tr>
</tbody>
</table>

**5.2 Habitat Assessment:** 4-5 passes Favourable (green); 2-3 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

**5.2.1 Transect level**
Vertigo moulinsiana monitoring at Ballynafagh Bog

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>At least 10ha of the site, including habitat in all 4 polygon areas, should be classed as Optimal and sub-optimal</td>
<td>0.73ha Optimal-Suboptimal &amp; 11.2 ha Suboptimal, but Polygon C Suboptimal-Unsuitable</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>At least 10ha of the site including habitat in all 4 polygon areas should be classed as Optimal and sub-optimal</td>
<td>12.36 ha</td>
<td>Pass</td>
</tr>
</tbody>
</table>

2007-2012

Habitat extent

At least 10ha of the samples on Transect 1 are dominated by suitable vegetation (Classes I & II) and over 80% of the samples on Transect 1 fall within soil moisture classes 3-5

64% of samples and 100% of samples

Pass

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>3% Cattle grazing and poaching has removed tall vegetation from Polygon C</td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>H05.01</td>
<td>garbage and solid waste</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>1% Dumping of horse manure</td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>K01.03</td>
<td>Drying out</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>15% Drying out of Blackwater Feeder channel</td>
<td></td>
</tr>
</tbody>
</table>

2013-2018

Three out of the four polygons at this site have dropped in status, and the changes are due to ecological effects (rather than mapping or interpretation issues). In most cases the habitat was found to be much drier in 2015 compared to previous surveys, and vegetation changes were noted also, the most dramatic of which is the large decrease in the occurrence of Carex rostrata along Transect 1. Based on the criteria of Moorkens & Killeen (2011), the Habitat Assessment for Ballynafagh Bog is Unfavourable Bad (red).

2007-2012
Vertigo moulinsiana monitoring at Ballynafagh Bog

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Red</td>
<td>Red</td>
<td>Amber</td>
<td>Red</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

- Based on the results of the population and habitat assessments, the Overall Assessment for Ballynafagh Bog is Unfavourable Bad (red).
- Much of the habitat at Ballynafagh Lake appears to be in good condition for V. moulinsiana, the snail is scattered in its distribution and present in low to moderate numbers. The Bonynge Bridge site is in excellent condition and the snail is abundant, whereas the snail is uncommon at Blackwood Feeder and the habitat is small in extent.

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: The habitat that supports Vertigo moulinsiana within this cSAC is the fen swamp habitat around Ballynafagh Lake and sections of the Blackwood Feeder between Ballynafagh and the Grand Canal, and along the Grand Canal west of Bonynge Bridge

Discussion:

As noted by Moorkens & Killeen (2011), this is an important site for Vertigo moulinsiana given the loss of the snail from other canal-side locations in Co. Kildare. This is a site which has seen a serious decline in recent years, and is in need of immediate and broad-ranging conservation actions if the species is to continue to survive there. The Overall Conservation Assessment for Ballynafagh Bog was Favourable (green) in the monitoring period 2007-2012 - there were very high numbers of Vertigo moulinsiana found across the site, and the habitat was deemed to be in good condition. The assessment result has dropped to Unfavourable Bad (red) for the current monitoring period (2013-2018). The population and habitat assessments have dropped to Unfavourable Bad (red), while the Future Prospects have dropped to Unfavourable Inadequate (amber). The decline in the population and habitat is considered to represent real decline (rather than interpretation or mapping issues), as the habitat has changed through drying out, vegetation change (e.g. succession, scrub encroachment) and heavy cattle-grazing (Polygon C). Actions required to improve the situation for Vertigo moulinsiana at Ballynafagh Bog include an overall strategic hydrological plan aimed at increasing, or at least maintaining, water levels across the site. Also needed is some targeted scrub removal, particularly at Transect 1, and a reduction in grazing in the Blackwater Feeder.
Vertigo moulinsiana monitoring at Ballynafagh Bog

It is worth noting that the Population Assessment criteria in particular are set quite high at this site. Moorkens & Killeen (2011) mention that in 2006 numbers of Vertigo moulinsiana were much lower across the site than in 2010. It may be that 2010 was an exceptionally good year for the species, and that the population criteria should be reduced/relaxed somewhat. However, even should these changes be made, the site would still struggle to pass assessment due to habitat changes (and this will continue to affect the snail's survival).

Monitoring recommendations:
The following was recommended by Moorkens & Killeen (2011) and remains valid: Due to the transitional nature of the habitat and the need for active management of the site, it should be placed under regular surveillance to ensure that it is being maintained in favourable conservation status in the short to medium term. This is particularly important until a suitable hydrological and management regime can be agreed and implemented in a manner that is proven to support the designated habitats and species.

Based on the above and due to the unfavourable assessment for this site, it is recommended that monitoring is carried out at yearly intervals, in tandem with management actions. If management actions do not commence immediately, monitoring for Vertigo moulinsiana should nonetheless take place within two years of this report, in an attempt to quantify and confirm the apparent large decrease in the population at the site. The monitoring frequency can be re-assessed in light of any improvements seen following changes to site management, after a period of years. The details of the monitoring should follow that of Moorkens & Killeen (2011):

- Repeat Transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Repeat Transect 2, as above, minimum 10 samples
- Take at least 10 samples from 4 locations on Blackwood Feeder, record information as above
- Take at least 10 samples from 4 locations at Bonyne Bridge, record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Note that it is possible that Transect 1 will be dropped or moved in future years due to the fact that it is located in an area that is drying and scrubbing over. However, for the moment, it is recommended that it continues to be monitored as is, because it represents changes that are happening at the site.

Management recommendations:
Moorkens & Killeen (2011) discuss the history of this site and management recommendations for it in detail, and it is recommended to read these carefully. Some aspects are reproduced here, and updated based on our most recent findings.

Artificially created and maintained habitats are some of the most difficult to protect, and a strategic plan for hydrological management needs to be put in place for this site. It is likely that some areas of the site will be able to be managed by careful hydrological control, and then the parts of the site that cannot be maintained this way will continue their transition towards drier habitat. Moorkens & Killeen note that the lake is fed by a surface water stream from the north-west, and from groundwater, and that the flow from the stream was partially diverted in the past meaning that there is less water now feeding the lake. Advice should be sought from a hydrologist, and in conjunction with an ecologist and a molluscan specialist, a hydrological plan should be put in place for this site. This should clearly outline areas which could be re-wetted, or have their wetness levels maintained.

The Ballynafagh Lake area (Polygon A) is subject to scrub encroachment in areas where it is drying out. Moorkens & Killeen noted that in 2010 “These areas do not generally coincide with the Vertigo moulinsiana habitats”. However, in 2015, the area where Transect 1 is located was clearly seen to be suffering from scrub encroachment and species composition change related to drying out. There is currently a programme of scrub control at the site (scrub control noted, particularly at the south-west). This should be continued, but in careful consultation with molluscan experts, and with a view to balancing the needs of all the valuable habitats and species at the site. Drying out is also likely to responsible for the drop in population in Polygon B.

The management of the Blackwood feeder needs to be considered in the context of its continued drying from a watercourse that was open water 50 years ago to its present state today. Moorkens & Killeen (2011) note that the "Blackwood Feeder has been drained and grazed in many areas, but the best remaining swamp areas are avoided by grazing animals and are where Vertigo moulinsiana remains". Unfortunately, the current case is that grazing animals have access to the old channel, and while levels are not extremely high, it has been enough to alter the vegetation. There are no longer areas of tall sedge or Glyceria maxima, the types of species which Vertigo moulinsiana is typically associated with. The channel also appears to be drying out, so a combination of management of grazers (exclusion, at least temporarily) and re-wetting is needed.

The issue of dumping of horse manure should also be addressed by liaison with local land owners and managers.
The habitat that supports Vertigo moulinsiana within this CSAC is the fen Swamp habitat around Ballynafagh Lake and sections of the Blackwood Feeder between Ballynafagh and the Grand Canal, and along the Grand Canal west of Bonyne Bridge

Discussion:
A retrospective Condition Assessment of the site and the feature based upon the 2006 survey results showed that it was Unfavourable Inadequate due to the very low numbers of V. moulinsiana found on the 2 transects. In 2010, numbers of V. moulinsiana found on the 2 transects had increased significantly with the result that the Overall Assessment is now Favourable.

The Ballynafagh Lake, Blackwood Feeder and Bonyne Bridge sites are a complex mixture of habitats, made more complicated by their artificial origin and the extreme hydrological changes that have occurred there over the last 200 years. Artificially maintained habitats are some of the most difficult to protect, and a strategic plan of water management needs to be put in place before grazing management can seriously be approached. It is likely that a subset of the site will be able to be managed by careful hydrological control, and then the parts of the site that cannot be maintained this way will continue their transition towards drier habitat. The latter areas will need grazing management if they are not to continue the transition to widespread scrub. At best, water management should ensure that the snail habitat will be maintained by wetness. Any grazing management introduced for other purposes should not interfere with the favourable condition of the snail habitat.

This is an important site for V. moulinsiana given the loss of the snail from other canalside locations in County Kildare. Due to the transitional nature of the habitat and the acknowledged need for active management of the site, the Annex I habitats and the V. moulinsiana habitats should be placed under regular surveillance to ensure that it is being maintained in favourable conservation status in the short to medium term. This is particularly important until a stable hydrological regime can be agreed and implemented in a manner that is proven to support the designated habitats and species.

Monitoring recommendations:
Although the Condition of the site, both in terms of habitat and Vertigo moulinsiana distribution and abundance has been assessed as Favourable, it is recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2013
Methods (see Section 4 of main report for full details). Prescription as follows:
- Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Repeat transect 2, as above, minimum 10 samples
- Take at least 10 samples from 4 locations on Blackwood Feeder, record information as above
- Take at least 10 samples from 4 locations at Bonyne Bridge, record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
The management is discussed by Moorkens in White Young Green et al. (2006) and Moorkens (2007) and is repeated below with minor modifications.

Existing Management
The V. moulinsiana habitat is on a natural peatland but within an area of artificially created wetland arising from digging Ballynafagh Lake by the Grand Canal Company in the late 18th Century. The lake fed the Blackwood Feeder, which was active until the 1950’s for the transport of turf and agricultural products (White Young Green et al., 2006). There has been no grazing management at Ballynafagh Lake for many years, but the Blackwood Feeder has been drained and grazed in many areas, but the best remaining swamp areas are avoided by grazing animals and are where V. moulinsiana remains. There is no grazing management at the north end of the feeder near to the old sluice gate. In the centre section an area of 1 hectare is grazed by 20 bullocks for 2 days a month between April and July. This has taken place for the last 10 years. In the lowest V. moulinsiana habitat, nearest the canal, there is some grazing at the northern end of this area (marked 4 in Figure 1.2). The grazing here consists of 40 cattle grazed extensively over approximately 40 hectare including access to this part of the feeder. The cattle are present from May to June annually.

Proposed management prescription for site
The Ballynafagh Lake area is subject to scrub encroachment where it has become dry enough. These areas do not generally coincide with the V. moulinsiana habitats, but in order to maintain the other habitats present some grazing would have a positive affect. The area of occupancy of V. moulinsiana has not changed significantly since 1997 (see Dromey, 1997). However, there is evidence of slow drying out of the area. The lake is fed by a surface water stream from the north west, and from groundwater. The flow from the stream was partially diverted thus there is less water feeding the lake compared with in the past. In order to maintain V. moulinsiana at the Ballynafagh Lake area, ground saturation and occasional inundation is needed. If water levels continue to reduce V. moulinsiana will be reduced to the deepest of the drains present and will ultimately disappear. No grazing management is recommended for the site for the snail at present. Any grazing management introduced for other purposes should not interfere with the favourable condition of the.
Vertigo moulinsiana monitoring at Ballynafagh Bog

snail habitat. However, a reconnection of the watercourse that fed the lake in the past should be considered.

The management of the Blackwood feeder needs to be considered in the context of its continued drying from a watercourse that was open water 50 years ago to its present state today. Ten years ago V. moulinsiana was more widespread and Pisidium pseudosphaerium was present along the extensive swamp habitat (Dromey et al., 1997). Now P. pseudosphaerium is no longer present and V. moulinsiana is reduced to the three short areas with some remaining habitat. These areas should be protected from overgrazing, where stock should be reduced to 0.6 livestock units per hectare or temporary electric fencing placed around the habitat to prevent its grazing. Ultimately, the source of the groundwater feeding the remaining swamp habitat needs to be understood and protected or enhanced, as management of this habitat is wetness rather than grazing driven. This requires a specific hydrogeological survey. This also applies to the Bonynge Bridge site.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM11  County: Offaly
SAC Site Code: 000571  Charleville Wood

Location description (from baseline survey):

1.2 General Habitat Description (from baseline survey):
The general habitat in which Vertigo moulinsiana is present at Charleville Lake is a lake fringe area of swamp fen. The EU habitats that this relates to are water fringe vegetation comprising medium-tall waterside communities (CORINE 53.14) with some with some rich fen characteristics (CORINE 54.2, Annex I 7230) (Romão, 1996; Devillers et al., 1991). The snail is found typically on Typha angustifolia, Carex riparia, Carex rostrata, C. acutiformis in association with Equisetum fluviatile and Phragmites australis. The water table was above ground surface level but with a litter layer in very humid conditions above the water table. The specific areas that are within a wider mosaic, but that form specific V. moulinsiana habitat fit the M27 Rodwell characteristic vegetation classification (Rodwell, 1991). This falls within the more general habitat of reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Tall Carex species, Typha angustifolia, Carex rostrata, Phragmites australis
Class II: Equisetum fluviatile, Iris pseudacorus
Class III: Phalaris arundinacea
Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:
Charleville Lake supports a good population of Vertigo moulinsiana, with abundant suitable habitat around the fringes of the lake, and presumably also in parts of the inaccessible centre. In addition to the already known Vertigo moulinsiana habitat, the species was found to be present in an area of wet woodland with an understorey of tall Carex species to the east, and this area has been added to the site as a new polygon. This is an important site, not only because of its healthy Vertigo moulinsiana population, but also because it supports excellent examples of ancient and wet woodlands, and a range of uncommon plants, animals and fungi.

Discussions with the local NPWS Conservation Ranger revealed that the site is believed to be infilling more quickly over recent years, perhaps due to siltation arising from peat extraction on nearby raised bogs, and consideration has been given to dredging areas of the lake (in a manner sensitive to the Vertigo moulinsiana population) in order to maintain the open water element. Our recommendation is to employ all other means possible to reduce/eliminate the silt reaching the lake, rather than to undergo dredging which is likely to be destructive of at least some habitat. We also recommend detailed hydrological and vegetation monitoring be instigated at the site to inform any and all future management at this important site.

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT</th>
<th>1</th>
<th>MONITORING PERIOD:</th>
<th>2013-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start point:</td>
<td>N 31298 22773</td>
<td>As for 2007-2012</td>
<td></td>
</tr>
<tr>
<td>End point:</td>
<td>N 31284 22677</td>
<td>As for 2007-2012</td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>As for 2007-2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling frequency:</td>
<td>As for 2007-2012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Vertigo moulnsiana monitoring at Charleveille Lake**

**4. RESULTS**

**Polygon habitat characteristics**

<table>
<thead>
<tr>
<th>Monitoring Period: 2013-2018</th>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Optimal-Suboptimal</td>
<td>7.5576</td>
<td>Polygon A status is Optimal-Suboptimal. Due to the presence of suitable vegetation and wetness all along the fringe of the lake, the existing polygons (drawn by Moorkens &amp; Killeen (2011), and labelled A to E) were merged to form a single polygon extending around the lake.</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Suboptimal-Unsuitable</td>
<td>9.2269</td>
<td>Polygon B is a new polygon, with Suboptimal-Unsuitable status, created to encompass the inaccessible habitat in the centre of the lake. This area is exceptionally difficult to access, consisting mostly of floating vegetation. It is likely to contain some areas of suitable habitat for the snail.</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Suboptimal</td>
<td>5.8881</td>
<td>Polygon C is also a new polygon and was created to encompass the Suboptimal habitat of tall sedge in wet woodland south of the boathouse. This wet woodland is relatively recent in origin - being shown as rough pasture and marsh (rather than trees/woodland) on the six-inch OS maps.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring Period: 2007-2012</th>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-optimal with optimal areas</td>
<td>A Suboptimal</td>
<td>6.2</td>
<td>Sub-optimal and optimal habitat is found all around the margins and extending into parts of Charleville Lake. This covers a maximum area of 6.2ha.</td>
<td></td>
</tr>
</tbody>
</table>

**Transect samples**

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring period 2013-2018 Transect 1 (15 samples)</td>
<td>2013-2018</td>
<td>1</td>
<td>1 01a</td>
<td>5</td>
<td>19</td>
<td>24</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
<td>2013-2018</td>
<td>1</td>
<td>2 01b</td>
<td>4</td>
<td>80</td>
<td>84</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
<td>2013-2018</td>
<td>1</td>
<td>3 01c</td>
<td>4</td>
<td>121</td>
<td>125</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
<td>2013-2018</td>
<td>1</td>
<td>4 02a</td>
<td>1</td>
<td>80</td>
<td>81</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
<td>2013-2018</td>
<td>1</td>
<td>5 02b</td>
<td>3</td>
<td>82</td>
<td>85</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
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<td>1</td>
<td>6 02c</td>
<td>2</td>
<td>81</td>
<td>83</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
<td>2013-2018</td>
<td>1</td>
<td>7 03a</td>
<td>6</td>
<td>25</td>
<td>31</td>
<td>I</td>
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<td>Optimal</td>
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<tr>
<td></td>
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<td>1</td>
<td>8 03b</td>
<td>6</td>
<td>62</td>
<td>68</td>
<td>I</td>
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</tr>
<tr>
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<td>1</td>
<td>9 03c</td>
<td>3</td>
<td>42</td>
<td>45</td>
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</tr>
<tr>
<td></td>
<td>2013-2018</td>
<td>1</td>
<td>10 04a</td>
<td>0</td>
<td>4</td>
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<td>I</td>
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<td>Optimal</td>
</tr>
<tr>
<td></td>
<td>2013-2018</td>
<td>1</td>
<td>11 04b</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
<td>2013-2018</td>
<td>1</td>
<td>12 04c</td>
<td>1</td>
<td>9</td>
<td>10</td>
<td>I</td>
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<td>9</td>
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<td>15 05c</td>
<td>1</td>
<td>40</td>
<td>41</td>
<td>IV</td>
<td>3</td>
<td>Optimal</td>
</tr>
</tbody>
</table>

Monitoring period 2007-2012 Transect 1 (17 samples)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>1 #1a at N31298 22773</td>
<td>14</td>
<td>7</td>
<td>21</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 5. CONDITION ASSESSMENT

<table>
<thead>
<tr>
<th>Spot Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring period 2013-2018 (13 samples)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>01a</td>
<td>N 31239 22550</td>
<td>0</td>
<td>41</td>
<td>41</td>
<td>II</td>
<td>5</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>02a</td>
<td>N 31247 22352</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>3</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>02b</td>
<td>N 31247 22352</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>II</td>
<td>3</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>03a</td>
<td>N 31392 22759</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>03b</td>
<td>N 31392 22759</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>04a</td>
<td>N 31548 22709</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>04b</td>
<td>N 31548 22709</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>05a</td>
<td>N 31534 22696</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>05b</td>
<td>N 31534 22696</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>II</td>
<td>5</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>06a</td>
<td>N 31647 22595</td>
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<td>2</td>
<td>3</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
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<td>2013-2018</td>
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<td>N 31647 22595</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>07a</td>
<td>N 31747 22415</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>07b</td>
<td>N 31747 22415</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Charleville Lake

5.1 Population Assessment:  3 passes Favourable (green); 2 pass Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Density</td>
<td>10 samples (from a minimum of 15 samples) on the Transect should have &gt;20 V. moulinsiana individuals</td>
<td>12 samples with &gt;20 individuals</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in all five of the sample areas (minimum 15 samples to be taken)</td>
<td>Present in all 5 areas</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Density</td>
<td>10 samples (from a minimum of 15 samples) on the Transect should have &gt;20 V. moulinsiana individuals</td>
<td>13 samples with &gt;20 individuals</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in all five of the sample areas (minimum 15 samples to be taken)</td>
<td>Present in all 5 areas</td>
<td>Pass</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in at least four other locations across the site (minimum six sample locations, and including at least one in Polygon C)</td>
<td>Present in all 4 areas</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2 Habitat Assessment:  4 passes Favourable (green); 2-3 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>75% of the samples on the Transect are dominated by suitable vegetation (Classes I &amp; II) (minimum 15 samples)</td>
<td>80% with suitable vegetation</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat quality</td>
<td>75% of the samples on the Transect fall within soil moisture classes 3-5 (minimum 15 samples)</td>
<td>100% with soil moisture classes 3-5</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat extent</td>
<td>75% of the samples on the Transect are dominated by suitable vegetation (Classes I &amp; II) (minimum 15 samples)</td>
<td>100% with suitable vegetation</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat quality</td>
<td>75% of the samples on the Transect fall within soil moisture classes 3-5 (minimum 15 samples)</td>
<td>100% with soil classes 3-5</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>&gt;5ha of site optimal and sub-optimal</td>
<td>7.6ha Optimal-Suboptimal</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Habitat quality</td>
<td>At least 25% of Polygon C supports habitat consisting of patches of tall sedge vegetation, with soil moisture class 3-5</td>
<td>&gt;25% supports suitable habitat</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>&gt;5ha of the site optimal and sub-optimal</td>
<td>6.4 ha</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Mon. period Habitat Notes

In the monitoring period 2007-2012, Vertigo moulinsiana was recorded in all 15 samples taken across five locations on the transect, with high numbers in many samples. Similarly, the current survey recorded Vertigo moulinsiana in all 15 samples across five sample locations on the transect, with >20 individuals at 12 of 15 samples. Numbers of individuals recorded were down on the previous survey, but good numbers were recorded, nonetheless. In the current survey, additional samples were taken from around the lake shore, and also in areas of wet woodland. To take account of these and to better represent the occurrence of Vertigo moulinsiana across the site, a new criterion was added. Based on the criteria of Moorkens & Killeen (2011), as well as the new criterion added, the population assessment for Charleville Lake remains Favourable (green).

In the monitoring period 2007-2012, the snail is scattered in its distribution and is locally common.

2007-2012
Vertigo moulinsiana monitoring at Charleville Lake

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>H05.01</td>
<td>garbage and solid waste</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>10%</td>
<td>Lots of plastic waste around edge of lake</td>
</tr>
<tr>
<td>2013-2018</td>
<td>J02.11.02</td>
<td>Other siltation rate changes</td>
<td>Outside</td>
<td>Medium</td>
<td>Negative</td>
<td>100%</td>
<td>Siltation of lake from nearby peat-cutting could lead to loss of habitat.</td>
</tr>
<tr>
<td>2013-2018</td>
<td>K04.05</td>
<td>damage by herbivores (including game species)</td>
<td>Inside</td>
<td>Low</td>
<td>Positive</td>
<td>30%</td>
<td>Deer. Low levels of trampling helpful in keeping woodland habitat open</td>
</tr>
<tr>
<td>2007-2012</td>
<td>H01</td>
<td>Pollution to surface waters (limnic, terrestrial, marine &amp; brackish)</td>
<td>Outside</td>
<td>Low</td>
<td>Negative</td>
<td>6.2ha</td>
<td>As the lake is fed by surface water, a major pollution incident (e.g. petrochemical) or increased nutrient levels leading to eutrophication would have a detrimental effect on the snail population, but again there is no evidence of pollution to date.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>J02.05</td>
<td>Modification of hydrographic functioning, general</td>
<td>Outside</td>
<td>Low</td>
<td>Positive</td>
<td>6.2ha</td>
<td>At the Charleville Lake site, the lake level is managed by means of a sluice, which at present is maintaining and excellent height and consistency of water in the lake. If at some point in the future the sluice was to malfunction or be changed, resulting in greater fluctuations in lake level, this would go from a positive influence to a negative influence. There is no indication of change or plans for change at present.</td>
</tr>
</tbody>
</table>

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

In general, the site is in good condition for V. moulinsiana.

The 2007-2012 monitoring period identified four Optimal and Sub-optimal habitat polygons around the margins of Charleville Lake, covering an area of 6.2ha. Following the current survey, the existing polygons were merged to form a single polygon (called Polygon A) of 7.6ha extending around the lake margin. The suitability is Optimal-Suboptimal. The habitat where the transect is located occurs in Polygon A, and continues to support the tall vegetation and wetness necessary for supporting a population of Vertigo moulinsiana. A new Suboptimal- Unsuitable polygon (9.2ha; Polygon B) was created to encompass the inaccessible habitat in the centre of the lake, which is likely to support some pockets of suitable habitat for the snail. Another new polygon (5.9ha; Polygon C) was created to encompass the Suboptimal habitat of the more recently developed wet woodland to the south of the boathouse, which supports an understorey of tall Carex species and which was found to support Vertigo moulinsiana. Based on the criteria of Moorkens & Killeen (2011), along with one additional criterion, the habitat assessment for Charleville Lake is Favourable (green).

There is little evidence of any major threat to the Vertigo moulinsiana population at Charleville Lake in the short- to medium-term. However, siltation is thought to be occurring at the site from nearby peat harvesting (NPWS, pers. comm.) and in the long-term this may pose a threat to the Vertigo moulinsiana habitat by accelerating drying out and succession. However, given the timescale for such an effect and the possibility of mitigating the issue significantly through management (e.g. filters, silt traps, etc.) the Future Prospects are considered to be Favourable (green).

As the impacts at present are low, Future prospects have been assessed as Favourable.
6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: The habitat that supports Vertigo moulinsiana within this CSAC is the fringe swamp habitat at the edge of Charleville Lake. Access is from the main road (N52), and a pedestrian route enters near the lake edge.

Discussion: Charleville Lake supports a good population of Vertigo moulinsiana, with abundant suitable habitat around the fringes of the lake, and presumably also in parts of the inaccessible centre. In addition to the already known Vertigo moulinsiana habitat, the species was found to be present in an area of wet woodland with an understorey of tall Carex species to the east, and this area has been added to the site as a new polygon. This is an important site, not only because of its healthy Vertigo moulinsiana population, but also because it supports excellent examples of ancient and wet woodlands, and a range of uncommon plants, animals and fungi.

Discussions with the local NPWS Conservation Ranger revealed that the site is believed to be infilling more quickly over recent years, perhaps due to siltation arising from peat extraction on nearby raised bogs, and consideration has been given to dredging areas of the lake (in a manner sensitive to the Vertigo moulinsiana population) in order to maintain the open water element. Our recommendation is to employ all other means possible to reduce/eliminate the silt reaching the lake, rather than to undergo dredging which is likely to be destructive of at least some habitat. We also recommend detailed hydrological and vegetation monitoring be instigated at the site to inform any and all future management at this important site.

Monitoring recommendations:
The site at Charleville Lake is in favourable condition and should be surveyed once during the next monitoring period (i.e. six years from previous survey), unless any notable changes occur at the site in terms of the hydrology or ecology. The monitoring procedures should follow that of Moorkens & Killeen (2011), with some additions to take account of the new habitat areas now included:

- Repeat Transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 15 samples from 5 separate sample sites
- Take samples from at least 6 different locations across the site, to include at least one from Polygon C, and record information as above.
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable. In particular, pay attention to the newly added Polygon C and re-assess both the boundary and habitat suitability.
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
There are useful management notes provided in Moorkens & Killeen (2011) for this site, and these should be read in conjunction with the notes provided here.

Apart from the hydrology, there is little to no management taking place at this site, and it is recommended to keep the status quo. The water levels are managed by a sluice, and this should continue. Information from local NPWS staff has indicated that silt run-off from nearby peat cutting may be accelerating the infilling, and hence drying out, of the lake. Therefore all possible actions should be taken to reduce/eliminate silt reaching the site in the first place. A variety of options are available - settlement ponds, filters, etc. The most suitable should be employed immediately, and preferably well outside the perimeters of the site to minimise direct disturbance due to installation or maintenance works.

A detailed hydrological monitoring regime should be instigated at this site to enable informed decision making regarding the water level and water quality management at the site. This should be accompanied with vegetation monitoring also. This is needed as this is a very important site for Vertigo moulinsiana (large population, including in an unusual habitat - shaded wet woodland), as well as being important for supporting a range of uncommon plant, animal, fungus and habitat types (see SAC site synopses for some further details).

It is understood that dredging of the middle of the lake is being considered based on the fact that siltation may be occurring. This would be very destructive, and it is not recommended as part of management of the site for Vertigo moulinsiana or its habitat. Should it be deemed necessary with other conservation considerations in mind, no such works should be undertaken without significant planning, and in particular, without significant input from a Vertigo expert.

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Overall Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Due to the Favourable (green) Population Assessment, Habitat Assessment and Future Prospects, the Overall Assessment for Charleville Lake is Favourable (green).</td>
</tr>
<tr>
<td>2007-2012</td>
<td></td>
</tr>
</tbody>
</table>

Tuesday, October 24, 2017
Page 6 of 7
Vertigo moulinsiana monitoring at Charleville Lake

2007-2012

**Area of occupancy:** The habitat that supports Vertigo moulinsiana within this cSAC is the fringe swamp habitat at the edge of Charleville Lake. Access is from the main road (N52), and a pedestrian route enters near the lake edge.

**Discussion:**

The Condition of the site and the feature based upon the 2010 survey has been assessed as Favourable. The targets have been passed for all of the 3 performance indicators. The results obtained in 2010 are very similar to those in 2006 (Appendix). This is an important site for V. moulinsiana, from its geographical location, the type of habitat, the absence of threats and the numbers of the snail present.

**Monitoring recommendations:**

Given the site is in good Condition, both in terms of habitat and Vertigo moulinsiana distribution and abundance, it is recommended that monitoring is carried out at 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

- **Frequency:** Next monitoring due 2013
- **Methods** (see Section 4 of main report for full details). Prescription as follows:
  - Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 15 samples from 5 separate sample sites
  - Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
  - Assess the management regime and impacts upon the habitat for V. moulinsiana
  - Use results to determine overall condition assessment

**Management recommendations:**

Charleville Lake lies within a larger deciduous woodland area, dominated by oak. Thus the important snail habitat area does not require to fit in with a wider grazing or agricultural regime. The area should remain unmanaged by grazing or other active management for the 2010-2013 period. The sluice gate management should not be changed from present.

The Vertigo moulinsiana habitat is maintained by its high groundwater table and by inundation of the lake water at wet times of year. The lack of grazing has led to a build up of deep litter which rises above the inundation at times of year when the snails are at litter level. During active periods, the snails are in humid conditions high on the stems of the swamp vegetation. The site would be vulnerable to long term hydrogeological changes, and any water abstraction from the lake or stream on the western perimeter that feeds it, or other change that would result in a lowering of the groundwater table at any time of year.

The very high numbers of the species present at the site during this survey and during all surveys in the past places a high level of importance on this site. The hydrological management needs to be maintained in a manner that does not interfere with the integrity of the site. The sluice should continue to let in the current level of water, and should not be opened or closed with any more frequency than at present. Rapid changes in water level can lead to snail kills from a loss of humidity (lowering of water) or drowning (flooding of litter during periods where the snail is inactive). A management agreement is recommended between NPWS and the landowner to manage this.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code:VmCAM12 County: Limerick
SAC Site Code: 000174 Curraghchase Woods

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>3-4 October 2016</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>9 October 2010</td>
<td>Evelyn Moorkens &amp; Ian Killeen</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

The general habitat in which Vertigo moulinsiana is present at Curragh Chase is a lake fringe area of swamp fen. The EU habitats that this relates to are water fringe vegetation comprising medium-tall waterside communities (CORINE 53.14) with some with some rich fen characteristics (CORINE 54.2, Annex I 7230) (Romão, 1996; Devillers et al., 1991). The snail is found typically on Typha angustifolia, Carex riparia, Carex rostrata, C. acutiformis, Cladium mariscus in association with Equisetum fluviatile and Phragmites australis. The water table was above ground surface level but with a litter layer in very humid conditions above the water table. The specific areas that are within a wider mosaic, but that form specific V. moulinsiana habitat fit the M27 Rodwell characteristic vegetation classification (Rodwell, 1991). This falls within the more general habitat of reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Tall Carex species
Class II: Cladium mariscus, Equisetum fluviatile, Glyceria maxima, Phragmites australis, Typha angustifolia, Sparganium erectum
Class III: Carex paniculata, Mentha aquatica, Schoenus nigricans, Iris pseudacorus
Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

The best habitat for Vertigo moulinsiana at Curraghchase Woods remains the fringing vegetation of the lakes in the forest park. The species is widely distributed around the lakes with the vegetation dominated by Carex acutiformis, with Sparganium erectum, Carex paniculata and Iris pseudacorus. The water levels in the lakes maintain a suitable wetness for Vertigo moulinsiana within the areas of suitable vegetation. There is no reason to think the species will not continue to occur around the lakes into the future. In contrast to this, the fen habitat to the south has been affected by cattle grazing, scrub clearance and the dumping of brash. The snail was not found here in the current survey and the habitat suitability has declined. Liaison with the landowner and changes to the grazing regime are required to allow the habitat to recover to a state that is more suitable for supporting Vertigo moulinsiana.

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT: 0</th>
<th>MONITORING PERIOD: 2013-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start point: NO TRANSECT RECORDED</td>
<td></td>
</tr>
<tr>
<td>End point:</td>
<td></td>
</tr>
<tr>
<td>Transect length: Direction:</td>
<td></td>
</tr>
<tr>
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4. RESULTS

Polygon habitat characteristics

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Vertigo moulinsiana monitoring at Curragh Chase

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<td>R 41076 48495</td>
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</tr>
</tbody>
</table>
### 5. CONDITION ASSESSMENT

#### 5.1 Population Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2012</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Area of occupancy</td>
<td>Adult or sub-adult snails are present in at least two out of four locations in Polygons A and B (minimum 10 samples)</td>
<td>Present in 3 locations</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in at least two locations in the fen/swamp area in Polygons E and F (minimum 10 samples)</td>
<td>Adult or sub-adult snails absent</td>
<td>Fail</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Species extent</td>
<td>Adult or sub-adult snails are present in at least one location in Polygons C and D (minimum 10 samples)</td>
<td>Present in 2 locations</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Area of occupancy</td>
<td>Adult or sub-adult snails are present in at least one location along the southern side of the lake (sites 1-5 of this survey) (minimum 10 samples)</td>
<td>V. moulinsiana absent</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in at least 2 locations, one of which must be in the main swamp area (sites 20-24 of this survey) (minimum 10 samples)</td>
<td>n 2 places at the E end, absent from main swamp</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Species extent</td>
<td>Adult or sub-adult snails are present in at least 4 other locations around the lake (sites 6-13 of this survey) (minimum 10 samples)</td>
<td>Found at 6 other locations</td>
<td>Pass</td>
</tr>
</tbody>
</table>

#### 5.2 Habitat Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

#### 5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2012</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
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<td></td>
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</tbody>
</table>

#### 5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>1.8-2.2 ha of the site sub-optimal with optimal areas</td>
<td>2.07ha with habitat Suboptimal or better</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>1.8-2.2 ha of the site sub-optimal with optimal areas</td>
<td>2.08 ha, all Sub-optimal</td>
<td>Pass</td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Curragh Chase

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>Over 80% of the samples at sites at the lakes (Polygons A, B, C and D) are dominated by suitable vegetation (Classes I &amp; II) AND fall within soil moisture classes 3-5</td>
<td>80% dominated by suitable vegetation and 100% fall within soil moisture classes 3-5</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Habitat type</td>
<td>Over 80% of the samples at sites at the fen/swamp (Polygons E and F) are dominated by suitable vegetation (Classes I &amp; II) AND fall within soil moisture classes 3-5</td>
<td>60% dominated by suitable vegetation and 100% fall within soil moisture classes 3-5</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>Over 80% of the samples at sites at the lake (minimum 10 sites to be sampled) are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5</td>
<td>100%</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat type</td>
<td>Over 80% of the samples at the fen (minimum 10 sites to be sampled) are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5</td>
<td>100%</td>
<td>Pass</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Habitat Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>In the monitoring period 2007-2012, four Suboptimal habitat polygons were delineated around the Curragh Chase Forest Park lakes, while two more Suboptimal polygons were located in the fen to the south. Following the current survey, the four polygons around the lake were raised to Optimal status due to the suitable nature of the vegetation and wetness. This change is considered one of interpretation, as there is no indication there has been ecological change in this area. The polygons in the fen are now classed as Suboptimal-Unsuitable, and have been impacted by grazing, clearance of scrub and dumping of brash. Based on the criteria of Moorkens &amp; Killeen (2011), with some minor alterations, the habitat assessment for Curragh Chase is Unfavourable Inadequate (amber).</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Much of the habitat at the site appears to be in good condition for V. moulinsiana,</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>30%</td>
<td>Herd of 18 cattle with access to fen, but predominatly graze grassland above</td>
</tr>
<tr>
<td>2013-2018</td>
<td>A10.01</td>
<td>removal of hedges and copses or scrub</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>3%</td>
<td>Scrub removal, with associated dumping in fen</td>
</tr>
<tr>
<td>2013-2018</td>
<td>H05.01</td>
<td>garbage and solid waste</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>5%</td>
<td>Dumping of spoil and cleared scrub</td>
</tr>
<tr>
<td>2007-2012</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Neutral</td>
<td>0.7ha</td>
<td>Cattle grazing only applies in the fen site. At present cattle trample and poach around the periphery of the suitable V. moulinsiana habitat, but with present stocking levels have very little (neutral) impact.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.01</td>
<td>temperature changes (e.g. rise of temperature &amp; extremes)</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>1.4ha</td>
<td>The suitable habitat around the lake margins is very narrow and thus susceptible to flooding and / or drying.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.02</td>
<td>droughts and less precipitations</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>1.4ha</td>
<td></td>
</tr>
<tr>
<td>2007-2012</td>
<td>M01.03</td>
<td>flooding and rising precipitations</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>1.4ha</td>
<td></td>
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</table>
Vertigo moulinsiana monitoring at Curragh Chase

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Amber</td>
<td>Green</td>
<td>Amber</td>
<td>Amber</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Red</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
</tr>
</tbody>
</table>

6. DISCUSSION

Mon. period

2013-2018

**Area of occupancy:** The main habitat that supports Vertigo moulinsiana within this site is the fringe swamp habitat at the edge of the lake in the Forest Park. Access is from the main Forest Park car park.

**Discussion:**

The best habitat for Vertigo moulinsiana at Curragh Chase remains the fringing vegetation of the lakes in the forest park. The species is widely distributed around the lakes with the vegetation dominated by Carex acutiformis, with Sparganium erectum, Carex paniculata and Iris pseudacorus. The water levels in the lakes maintain a suitable wetness for Vertigo moulinsiana within the areas of suitable vegetation. There is no reason to think the species will not continue to occur around the lakes into the future. In contrast to this, the fen habitat to the south has been affected by cattle grazing, scrub clearance and the dumping of brash. The snail was not found here in the current survey and the habitat suitability has declined. Liaison with the landowner and changes to the grazing regime are required to allow the habitat to recover to a state that is more suitable for supporting Vertigo moulinsiana.

**Monitoring recommendations:**

Given the decline in the Vertigo moulinsiana population and distribution in the fen area to the south, monitoring of Curragh Chase should be carried out on a three yearly basis. The monitoring protocol should follow that of Moorkens & Killeen (2011), with just some alterations to clarify sampling locations:

- Take samples at 5 locations in polygons A and B, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Take samples at 5 locations in Polygons C and D, record as above, minimum 10 samples
- Take samples at a minimum of 2 locations in the fen site, record as above, minimum 10 samples
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

**Management recommendations:**

No changes to the management are required at the Curragh Chase Forest Park lakes to maintain suitable Vertigo moulinsiana habitat into the future. In the fen area, the level of cattle grazing should be reduced either by reducing the number of cattle with access to the area, or limiting the time for which cattle have access. The situation should be monitored to ensure any measures result in a recovery of the suitable vegetation in this area. No further scrub removal or dumping should be allowed to occur at the fen.

2007-2012

As the impacts in the foreseeable future are low, Future prospects have been assessed as Favourable (green).
Area of occupancy: The main habitat that supports Vertigo moulinsiana within this site is the fringe swamp habitat at the edge of the lake in the Forest Park. Access is from the main Forest Park carpark.

Discussion:
The Condition of the site and the feature based upon the 2010 survey has been assessed as Unfavourable. Although insufficient data was collected in 2005 to produce a retrospective Condition Assessment, there is clear evidence of a decline in the distribution and abundance of V. moulinsiana at both the lake and particularly the fen sites since 2005. It is highly unlikely that the decline results from lack of management.

Vertigo moulinsiana populations fluctuate naturally over time, and short term changes in environmental conditions can rapidly influence population size, especially if meteorological conditions have been extreme for the area in the months preceding the survey. The recent pattern of long dry summers followed by stormy wet winters may mean that the conditions for V. moulinsiana at Curragh Chase have become less favourable. Population size may be higher during wet, humid summers, whilst periods of drought can result in lower population levels. Population numbers for V. moulinsiana also vary considerably with season with low numbers in late winter and early spring to very high numbers in late summer and autumn when the snail's have reproduced (e.g. Killeen 2003a, b). Evidence from a UK SAC which had been monitored over a 10 year period showed the snail had declined (in both numbers and extent) in 4 of the 8 component sites within the larger SAC, and disappeared completely from two more, yet there was no clear evidence of any deterioration in the quality of the habitat (Tattersfield & Killeen, 2006). Some of these changes may be due to groundwater recharge changes over a large catchment scale, due to intensification of landuse in the wider area. The population at Curragh Chase should be monitored to see if it improves with better weather conditions, and if not then wider catchment issues will need to be investigated.

Monitoring recommendations:
Given the evidence for an overall deterioration in the Condition of the site, particularly in Vertigo moulinsiana distribution and abundance, it is recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2013
Methods (see Section 4 of main report for full details). Prescription as follows:
- Take samples at 5 locations on the southern side of the lake, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Take samples at 4-5 locations elsewhere around the lake, record as above, minimum 10 samples
- Take samples at a minimum of 2 locations in the fen site, record as above, minimum 10 samples
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
Existing Management
The swamp habitat around the lake margins are ungrazed. A few cattle are present in the fen but they do not have significant impact upon the wettest swamp areas.

Proposed management prescription for site
The Vertigo moulinsiana habitat is maintained by its high groundwater table and by inundation of the lake water at wet times of year. The absence of grazing at the lake has led to a build up of deep litter which rises above the inundation at times of year when the snails are at litter level. During active periods, the snails are in humid conditions high on the stems of the swamp vegetation. The site would be vulnerable to long term hydrogeological changes, and any water abstraction from the lake or stream on the western perimeter that feeds it, any eutrophication from inputs into the lake such as fertilizers or other change that would result in a lowering of the groundwater table at any time of year. The lake fringe vegetation should not be excessively managed, cut or removed, and should be allowed to naturally expand into transition swamp habitat as litter builds up.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM14  County: Westmeath
SAC Site Code: n/a  Not in SAC

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>19 October 2016</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>9 September 2010</td>
<td>Evelyn Moorkens &amp; Ian Killeen</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

The general habitat in which Vertigo moulinsiana is present at Kildallan Bridge is low lying old canal area of swamp fen with some spring flushing. The snail is found typically on Glyceria maxima in association with Phalaris arundinacea, and Iris pseudacorus with some sub storey mosses. The water table was above ground surface level in places. There are no EU habitats that correspond to this habitat, the closest CORINE category would be Atlantic and sub-Atlantic humid meadows (37.21) (Devillers et al., 1991). This falls within the more general habitat of rich fen and flush (PF1), freshwater marsh (GM1), reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000). Vertigo moulinsiana is also found on marginal vegetation at the canal banks typically on Carex riparia, Carex rostrata, and Phragmites australis with a litter layer in very humid conditions above the water table. The EU habitats that this relates to are water fringe vegetation comprising medium-tall waterside communities (CORINE 53.14) (Romão, 1996; Devillers et al., 1991).

1.3 Definition of Vegetation Classes (from baseline survey):

| Class I          | Glyceria maxima                                      |
| Class II         | Phragmites australis, Carex rostrata, Iris pseudacorus|
| Class III        | Urtica dioica                                         |
| Class IV         | All other species                                     |

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

The core of the Vertigo moulinsiana population at Kildallan Bridge is in the back-drain to the southeast of the bridge, but the species is also found in other locations in the back-drain and along the fringing vegetation of the canal itself, on both banks. Glyceria maxima is the dominant species in most of the locations where Vertigo moulinsiana is found. The fringing vegetation of the canal is shorter and sparser than during the previous survey, and has evidently been subject to clearance and cutting. The grass of the towpath is mown, and it appears that the fringing vegetation may be cut in a similar manner. This is reducing the available habitat for Vertigo moulinsiana, and is reducing the connectivity of habitat along the canal. The back-drain habitat is vulnerable to clearance by adjacent landowners or by Waterways Ireland as part of their regular maintenance, and the presence of the snail should be brought the attention of the appropriate staff within the organisation. Overall the Vertigo moulinsiana population at Kildallan Bridge is in reasonable condition, and is expected to continue to survive at the site into the future.

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT</th>
<th>MONITORING PERIOD</th>
<th>Start point</th>
<th>End point</th>
<th>Transect length</th>
<th>Description</th>
<th>Sampling frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2007-2012</td>
<td>N 34464 56315</td>
<td>N 34411 56353</td>
<td>65</td>
<td>swamp</td>
<td>As for 2007-2012</td>
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</table>
4. RESULTS

Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Monitoring Period:</th>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A</td>
<td>Optimal</td>
<td>0.2601</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>Suboptimal-Unsuitable</td>
<td>0.211</td>
<td></td>
</tr>
</tbody>
</table>

Monitoring Period: 2007-2012

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Optimal</td>
<td>0.26</td>
<td>only 2 small areas with good swamp habitat were identified: just to the south-east of Kildallan Bridge (Polygon A, area 0.26ha) and to the north-east of Kill Bridge (polygon B, area 0.21ha).</td>
</tr>
<tr>
<td>B</td>
<td>Sub-optimal</td>
<td>0.21</td>
<td>to the north-east of Kill Bridge (polygon B, area 0.21ha).</td>
</tr>
</tbody>
</table>

Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring period 2013-2018 Transect 1 (14 samples)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>1</td>
<td>0m</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>2</td>
<td>5m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
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<td>10m</td>
<td>2</td>
<td>11</td>
<td>13</td>
<td>I</td>
<td>3</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>4</td>
<td>15m</td>
<td>1</td>
<td>4</td>
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Monitoring period 2007-2012 Transect 1 (15 samples)

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Vertigo moulinsiana monitoring at Kildallan Bridge

### Spot Samples

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### Monitoring period 2007-2012 (39 samples)

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### 5. CONDITION ASSESSMENT

#### 5.1 Population Assessment:

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<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
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<td>6 samples with &gt;20 individuals</td>
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<td>Presence/Absence</td>
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<td>Present in 14 samples</td>
<td>Pass</td>
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</table>

### Vertigo moulinsiana monitoring at Kildallan Bridge

- **2007-2012**
  - 08 N 34618 56100: 5 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 09 N 34618 56100: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 10 N 34641 56046: 2 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 11 N 34641 56046: 2 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 12 N 34641 56046: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 13 N 34646 55995: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 14 N 34646 55995: 1 pass Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 15 N 34646 55995: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 16 N 34664 55995: 3 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 17 N 34664 55995: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 18 N 34664 55995: 1 pass Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 19 N 34699 55882: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 20 N 34699 55882: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 21 N 34699 55882: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 22 N 34206 56543: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 23 N 34206 56543: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 24 N 34206 56543: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 25 N 33696 56860: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 26 N 33696 56860: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 27 N 33696 56860: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 28 N 33518 56824: 17 passes Favourable (green); 5 passes Unfavourable Inadequate (amber); 22 passes Unfavourable Bad (red)
  - 29 N 33518 56824: 3 passes Favourable (green); 3 passes Unfavourable Inadequate (amber); 6 passes Unfavourable Bad (red)
  - 30 N 33518 56824: 8 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 10 passes Unfavourable Bad (red)
  - 31 N 33445 56776: 1 pass Favourable (green); 0 passes Unfavourable Inadequate (amber); 1 pass Unfavourable Bad (red)
  - 32 N 33445 56776: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
  - 33 N 33445 56776: 2 passes Favourable (green); 1 passes Unfavourable Inadequate (amber); 3 passes Unfavourable Bad (red)
  - 34 N 33255 56655: 0 passes Favourable (green); 0 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)
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  - 39 N 33185 56590: 1 pass Favourable (green); 0 passes Unfavourable Inadequate (amber); 1 pass Unfavourable Bad (red)

- **2013-2018**
  - 01 N 33445 56776: 8 samples with >20 individuals Pass
Vertigo moulinsiana monitoring at Kildallan Bridge

### 5.2 Habitat Assessment

#### 5.2.1 Transect level

<table>
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<tr>
<th>Mon. period</th>
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<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
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<td>2013-2018</td>
<td>1</td>
<td>Habitat quality</td>
<td>Over 80% of the samples on Transect 1 fall within soil moisture classes 3-5</td>
<td>100% fall within soil moisture classes 3-5</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat extent</td>
<td>Over 50% of the samples (minimum 14 taken) on Transect 1 are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>100% of samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat quality</td>
<td>Over 80% of the samples on Transect 1 fall within soil moisture classes 3-5</td>
<td>100% of samples</td>
<td>Pass</td>
</tr>
</tbody>
</table>

#### 5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>At least 4 other locations (minimum 8 sampled), which should include canal margins and marginal swamps (e.g. in Polygon B) are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5</td>
<td>4 other locations dominated by suitable vegetation and fall within soil moisture classes 3-5</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>At least 4 other locations (minimum 8 sampled), which should include canal margins and marginal swamps (e.g. at sites 10 or 11) are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5</td>
<td>10 locations</td>
<td>Pass</td>
</tr>
</tbody>
</table>

### 2007-2012 Habitat Notes

In the monitoring period 2007-2012, two small polygons supporting suitable habitat for Vertigo moulinsiana were identified at Kildallan Bridge. Polygon A, which encompassed the transect was located in a back-drain to the southeast of the bridge, while Polygon B was an area of back-drain further to the west. Both polygons were classed as Optimal.

### 2013-2018 Habitat Notes

The distribution of the Vertigo moulinsiana population at Kildallan Bridge shows a reduction since the previous survey, with 14 out of 14 locations positive on Transect 1, and just two out of eight locations positive in the wider area in the current survey. This compares with 13 out of 14 locations positive on Transect 1, and 10 out of 13 locations positive in the wider area in 2007-2012. Numbers were high at many locations on the transect, with Vertigo moulinsiana numbering in the hundreds for seven of the 14 locations. Based on the criteria of Moorkens & Killeen (2011), with one modification made to take better account of the amount of habitat area outside of the transect, the Population Assessment is Unfavourable Inadequate (amber).

Patches of habitat on the landward side of the canal towpaths are in good condition for V. moulinsiana, the snail is scattered in its distribution and is locally common. Sections of habitat on the canal banks are also in relatively good condition, but V. moulinsiana is much more scattered and present in low numbers.
### 5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A03.02</td>
<td>non intensive mowing</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>35%</td>
<td>Canal banks and emergent vegetation mown</td>
</tr>
<tr>
<td>2013-2018</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>-</td>
<td>Neutral</td>
<td>1%</td>
<td>Positive = Wider fringing vegetation due to bank slumping. Negative = Eutrophication and grazing</td>
</tr>
<tr>
<td>2013-2018</td>
<td>D01.01</td>
<td>paths, tracks, cycling tracks</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>10%</td>
<td>Recent, wide hardcore path constructed at SE end of site. Reduced connectivity of the back drain habitat and vegetation with that of the canal.</td>
</tr>
<tr>
<td>2013-2018</td>
<td>H01.05</td>
<td>diffuse pollution to surface waters due to agricultural and forestry activities</td>
<td>Outside</td>
<td>Low</td>
<td>Negative</td>
<td>2%</td>
<td>Silage bales stored in yard adjacent to, and above, Polygon A. Run-off is a potential issue</td>
</tr>
<tr>
<td>2013-2018</td>
<td>H05.01</td>
<td>garbage and solid waste</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>1%</td>
<td>Stone dumped from works in adjacent field = loss of habitat.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>J02.10</td>
<td>management of aquatic and bank vegetation for drainage purposes</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td></td>
<td>Potentially suitable canalside habitat for V. moulinsiana would comprise a zone of relatively dense sedge and Glyceria maxima at least 1.5m deep. Therefore, a 100m length of canal may have up to 150m² of habitat along each bank which would be affected by these activities.</td>
</tr>
<tr>
<td>2007-2012</td>
<td>J02.11.01</td>
<td>Dumping, depositing of dredged deposits</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5.4 Overall Assessment

2013-2018 There are a number of activities/threats that may have an influence on the future occurrence of Vertigo moulinsiana at Kildallan Bridge. Where the core of the population is found, in Polygon A, there are no imminent threats, though the storage of silage in a compound on higher ground above this area has the potential to impact on the canal back-drain here, for example through nutrient enrichment from run-off, were this to occur. The mowing and removal of the fringing vegetation of the canal itself is the main threat to the site as a whole, with mowing deemed to be occurring in approximately 35% of the canal length. Where previously dense stands of tall reeds lined the canal banks, they are now sparse and cut short, reducing the suitability of the habitat for Vertigo moulinsiana. Taking into account the distribution of Vertigo moulinsiana at the site, and the numbers present, and in light of the activities and threats present, the Future Prospects for the species at Kildallan Bridge are considered to be Favourable (green).

2007-2012 As the impact is at present moderate rather than severe, Future prospects have been assessed as Favourable (green). However, this assessment is made on the basis of no significant recent management. If/when the canal is dredged again, future prospects could move to Unfavourable.
### 6. DISCUSSION

**Monitoring period**

2013-2018

| Area of occupancy: | The habitats that support Vertigo moulinsiana at this site are the marginal swamps on the landward side of the Royal Canal towpaths, and along the uncult canal margins. Access is from a minor road off the R393 Mullingar to Ballynacarrigy road. |

**Discussion:**

The core of the Vertigo moulinsiana population at Kildallan Bridge is in the back-drain to the southeast of the bridge, but the species is also found in other locations in the back-drain and along the fringing vegetation of the canal itself, on both banks. Glyceria maxima is the dominant species in most of the locations where Vertigo moulinsiana is found. The fringing vegetation of the canal is shorter and sparser than during the previous survey, and has evidently been subject to clearance and cutting. The grass of the towpath is mown, and it appears that the fringing vegetation may be cut in a similar manner. This is reducing the available habitat for Vertigo moulinsiana, and is reducing the connectivity of habitat along the canal. The back-drain habitat is vulnerable to clearance by adjacent landowners or by Waterways Ireland as part of their regular maintenance, and the presence of the snail should be brought to the attention of the appropriate staff within the organisation. Overall the Vertigo moulinsiana population at Kildallan Bridge is in reasonable condition, and is expected to continue to survive at the site into the future.

**Monitoring recommendations:**

Due to the active management of the site for recreational activities by Waterways Ireland, monitoring should be carried out at three-yearly intervals to ensure that no major negative changes occur at the site. The monitoring should follow that proposed by Moorkens & Killeen (2011):

- Repeat Transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 14 samples
- Take at least 3 samples at each of at least 8 other locations with optimal habitat (should include marginal swamp at sites 10 or 11 of the 2010 survey), record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

**Management recommendations:**

No management is required for Polygon A, where the transect is located, as this area is currently ungrazed and uncut. However, it may be necessary to flag this area to Waterways Ireland, who may undertake back-drain clearance in the future as part of their canal maintenance programme. Liaison with the landowner who stores silage nearby (above) this habitat patch is urgently needed to ensure that nutrient run-off does not occur.

The Vertigo moulinsiana habitat of tall fringing vegetation along the canal margins has been negatively affected by cutting. This has resulted in areas of previously dense, tall vegetation becoming sparse and generally low-growing, thus becoming much less suitable for supporting Vertigo moulinsiana. The cutting of emergent vegetation should be limited to that necessary to maintain the canal in a working state, and where possible the fringing vegetation should be allowed to develop further along the canal, thereby increasing the area of suitable habitat for Vertigo moulinsiana.

---

### Monitoring period

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Amber</td>
<td>Green</td>
<td>Green</td>
<td>Amber</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

**Notes:**

- The Population Assessment is Unfavourable Inadequate (amber), and the Habitat Assessment and Future Prospects are Favourable (green), meaning that the Overall Assessment for Kildallan Bridge is Unfavourable Inadequate (amber).
Vertigo moulinsiana monitoring at Kildallan Bridge

2007-2012

Area of occupancy: The habitats that support Vertigo moulinsiana at this site are the marginal swamps on the landward side of the Royal Canal towpaths, and along the uncut canal margins. Access is from a minor road off the R393 Mullingar to Ballynacarriggy road.

Discussion:
The Condition of the site and the feature based upon the 2010 survey has been assessed as Favourable.

In the swamp areas on the landward side of the towpaths (polygon areas A and B), the Vertigo moulinsiana habitat is maintained by its high groundwater table which in part is due to seepage from the canal. The absence of grazing has led to a build up of deep litter which rises above any inundation at times of year when the snails are at litter level. During active periods, the snails are in humid conditions high on the stems of the swamp vegetation. The site would be vulnerable to long term hydrogeological changes, and any water abstraction from the canal or streams and ditches that feed the swamps, or other change that would result in a lowering of the groundwater table at any time of year.

Vertigo moulinsiana was also found occasionally at locations on the canal banks where the habitat had become relatively dense. There are numerous records from the 1970s to the end of the century of the snail from bankside habitats on both the Royal and Grand Canals. However, work by Waterways Ireland to re-open the canals has resulted in loss of habitat and V. moulinsiana populations (Moorkens & Killeen 2005, Moorkens 2007e). Thus, through management, stable canalside habitat is becoming increasingly rare in Ireland.

Monitoring recommendations:
Although the Kildallan Bridge site has been assessed as Favourable, both in terms of habitat and Vertigo moulinsiana distribution and abundance, given the vulnerability of the canalside population to inappropriate management, it is recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2013
Methods (see Section 4 of main report for full details). Prescription as follows:
- Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 14 samples
- Take at least 3 samples at each from at least 8 other locations with optimal habitat (should include marginal swamp at sites 10 or 11 of the 2010 survey), record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
Existing Management

The 2 areas of swamp on the south side of the towpaths are unmanaged and the condition of the habitat is maintained by local hydrology. The canal is subject to intermittent dredging and cutting of bankside vegetation.

Proposed management prescription for site

No grazing regime is appropriate for this site; the site needs to be managed so that there is sufficient transition vegetation at the fringe of the canal. It is essential that canal fringe management and weed control is carried out in a manner that is not damaging to this rare area of V. moulinsiana habitat, and that there is an instigation of a programme of expansion of fringe habitat that can be sustained and allow the species to spread back into the 10km squares that are currently lost to the species from their previous range. It is recommended that NPWS and Waterways work together to protect V. moulinsiana along the Royal Canal.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code:  VmCAM15  County:  Laois
SAC Site Code:  000869  Lisbigney Bog

1.2 General Habitat Description (from baseline survey):

In 1998 there was a good population of V. moulinsiana in wet swamp conditions. However, the land to the north of the habitat area had been drained. Some of the drained land had been planted with conifers and the rest was being used for grazing. In 2006 the general habitats in which Vertigo moulinsiana were previously present were visible but were much drier. They were then wet grassland grading into some rich fen characteristic habitat (CORINE 54.2, Annex I 7230) (Romão, 1996; Devillers et al., 1991). This included Carex paniculata, C. acutiformis and Filipendula ulmaria in low lying patches, but with Agrostis stolonifera, Festuca ovina, Vicia cracca, Deschampsia, and Phragmites australis. There was a little Mentha, but interspersed with Ranunculus. This drier habitat was that present in 2010. The habitat area falls between tall herb swamps (FS2) and wet grassland (GS4) of Fossitt (2000). While the habitat in 1998 would have related to M27 of Rodwell (1991), in 2006 it is closer to MG9 of Rodwell (1992).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I:  Not defined
Class II:  Not defined
Class III:  Not defined
Class IV:  Not defined

1.4 Definition of Soil Moisture Classes (from baseline survey):

1:  Dry. No visible moisture on ground surface.
2:  Damp. Ground visibly damp, but water does not rise under pressure.
3:  Wet. Water rises under light pressure.
4:  Very wet. Pools of standing water, generally less than 5cm deep.
5:  Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

The suitability of Lisbigney Bog for supporting Vertigo moulinsiana has declined since the species was first discovered there in 1998. Large drains in the area have dropped the groundwater level, and previously suitable areas of swamp are now too dry to support the snail. Even former smaller drains on the site are now completely dry. Succession is also occurring with trees and scrub species spreading at this site, and there has been a significant shift towards more acid-loving heath species (e.g. Molinia caerulea, Myrica gale, etc.). No suitable habitat for the snail was found in the 2010 survey and there has been no improvement since. Even with serious intervention in the form of drain-blocking and scrub removal, the site would be unlikely to recover to a state which will allow it to support habitat suitable for Vertigo moulinsiana, such are the changes which have taken place. Given the distance from the next nearest site supporting the snail, even if the habitat were to recover, it is likely that a re-introduction programme for the species at Lisbigney Bog would be necessary.

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT</th>
<th>MONITORING PERIOD</th>
<th>Start point</th>
<th>End point</th>
<th>Transect length</th>
<th>Direction</th>
<th>Description</th>
<th>Sampling frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2013-2018</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2007-2012</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. RESULTS

Polygon habitat characteristics

Monitoring Period: 2013-2018

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Unsuitable</td>
<td>5.7796</td>
<td>Polygon A status remains Unsuitable. Area includes dried out areas of swamp and wet woodland. Large drains are present. However, the polygon consists mostly of heathy grassland with a high cover of woody species such as Myrica gale and Ulex europaeus.</td>
</tr>
</tbody>
</table>

Monitoring Period: 2007-2012

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unsuitable</td>
<td>5.78</td>
</tr>
</tbody>
</table>

Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2012</td>
<td>0</td>
<td>0</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Spot Samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
</table>

Monitoring period 2013-2018 (4 samples)

- 2013-2018 01a S 45020 79057 0 0 0 1 Unsuitable
- 2013-2018 01b S 45020 79057 0 0 0 1 Unsuitable
- 2013-2018 02a S 44950 79053 0 0 0 2 Unsuitable
- 2013-2018 02b S 44950 79053 0 0 0 1 Unsuitable

Monitoring period 2007-2012 (1 sample)

- 2007-2012 01 S 44900 78900 0 0 0

5. CONDITION ASSESSMENT

5.1 Population Assessment: 1 pass Favourable (green); 0 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2012</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present at the site</td>
<td>Adult or sub-adult snails absent</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present at the site</td>
<td>V. moulinsiana absent</td>
<td>Fail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Vertigo moulinsiana was not found at Lisbigney Bog in 2006 or 2010, and again has not been found in the current survey. Based on the criteria of Moorkens &amp; Killeen (2011), the site Population Assessment for Lisbigney Bog is Unfavourable Bad (red).</td>
</tr>
<tr>
<td>2007-2012</td>
<td>V. moulinsiana could not be found</td>
</tr>
</tbody>
</table>

5.2 Habitat Assessment: 1 pass Favourable (green); 0 passes Unfavourable Bad (red)

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2012</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Vertigo moulsinsiana monitoring at Lisbigney Bog

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>At least 1 ha of the site sub-optimal with optimal areas</td>
<td>No suitable habitat present</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>At least 1 ha of the site sub-optimal with optimal areas</td>
<td>Total 5.78 ha of former habitat now unsuitable</td>
<td>Fail</td>
</tr>
</tbody>
</table>

Mon. period | Habitat Notes

2013-2018  Vertigo moulsinsiana was originally recorded from wet swamp areas; however, the site has dried out since then and in 2010 there was no suitable habitat present at the site. There has been no change in the current monitoring period, with no suitable habitat recorded at the site. Based on the criteria of Moorkens & Killeen (2011), the Habitat Assessment for Lisbigney Bog is Unfavourable Bad (red).

2007-2012  All of the formerly suitable habitat has become unsuitable

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>J02.15</td>
<td>Other human induced changes in hydraulic conditions</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>100%</td>
<td>Drains allowing drying out of habitat</td>
</tr>
<tr>
<td>2013-2018</td>
<td>K02.01</td>
<td>species composition change</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>100%</td>
<td>Scrubbing over with Salix spp. and Ulex europeaus</td>
</tr>
<tr>
<td>2007-2012</td>
<td>J02.01.02</td>
<td>reclamation of land from sea, estuary or marsh</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>5.78ha</td>
<td>Resulted in drying out of habitat</td>
</tr>
</tbody>
</table>

Mon. period | Future Prospects Notes

2013-2018  Vertigo moulsinsiana has not been recorded in the last three surveys of the site and no suitable habitat remains. The loss of suitable habitat is due to drying out (caused by drains) and consequent succession to a heathy/woody vegetation. The Future Prospects for Lisbigney Bog are Unfavourable Bad (red).

2007-2012  As the impact is severe, and there is no nearby population of V. moulsinsiana from which Lisbigney could recolonise if the habitat improved, Future prospects have been assessed as Unfavourable Bad

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
</tr>
</tbody>
</table>

Mon. period | Overall Notes

2013-2018  Population Assessment, Habitat Assessment and Future Prospects for Lisbigney Bog are all Unfavourable Bad (red); therefore, the Overall Assessment for this site is Unfavourable Bad (red).

2007-2012

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: The habitat known to have supported Vertigo moulsinsiana within this cSAC is the fen swamp habitat at the south of this site (Moorkens 1998). Access is from the road east of Durrow and south west of Ballinakill at S 449 789

Discussion: The suitability of Lisbigney Bog for supporting Vertigo moulsinsiana has declined since the species was first discovered there in 1998. Large drains in the area have dropped the groundwater level, and previously suitable areas of swamp are now too dry to support the
Vertigo moulinsiana monitoring at Lisbigney Bog

Snail. Even former smaller drains on the site are now completely dry. Succession is also occurring with trees and scrub species spreading at this site, and there has been a significant shift towards more acid-loving heath species (e.g. Molinia caerulea, Myrica gale, etc.). No suitable habitat for the snail was found in the 2010 survey and there has been no improvement since. Even with serious intervention in the form of drain-blocking and scrub removal, the site would be unlikely to recover to a state which will allow it to support habitat suitable for Vertigo moulinsiana, such are the changes which have taken place. Given the distance from the next nearest site supporting the snail, even if the habitat were to recover, it is likely that a re-introduction programme for the species at Lisbigney Bog would be necessary.

Monitoring recommendations:
Unless clear management actions are taken in order to restore the habitat at Lisbigney Bog to one that supports suitable vegetation and wetness, no further monitoring of the site is recommended.

Management recommendations:
As noted above, it would appear that the target species has been lost from this site and that the site has changed dramatically in terms of wetness and vegetation cover, such that it is no longer suitable for supporting the species. Even with considerable management effort, it is unlikely that this site would again support Vertigo moulinsiana, and certainly not without a re-introduction programme. Thus there are no management recommendations.

2007-2012

Area of occupancy: The habitat known to have supported Vertigo moulinsiana within this cSAC is the fen swamp habitat at the south of this site (Moorkens 1998). Access is from the road east of Durrow and south west of Ballinakill at S449789

Discussion:
The discussion from Moorkens (2007) is still pertinent:

"The good population of V. moulinsiana from Lisbigney appears to have either dramatically declined or has been lost from the site. The site was recommended as an SAC in 1998 because of the good population, and in order to act as a potential reservoir for increasing its distribution in the area, considering the large distance between this and other sites (Moorkens, 1998). Although the summer of 2006 was dry it is not likely that this is the cause of the decline, as the snail was in high numbers at other sites that had the same weather conditions. In 2001, the site was revisited and the habitat was still wet (Moorkens, 2001). This site visit included a check of the drains that influence the snail habitat. The main road drain in the area follows the main road in a south west direction away from Ballinakill and towards Rosconnell Glebe. There are three drains flowing into this from the site. One cuts off the north east top of the snail habitat, another meets this and flows to the south west outside the snail habitat. The third follows the land boundary division at the far north of the snail habitat and flows towards the road drain in a direction that is perpendicular to the road drain. During the visit it was noted that the north east drain had been deepened, and was approximately 1 metre lower than the other drains within the property. In the time that has elapsed between 2001 and 2006 this may have facilitated the gradual drying out of the habitat beyond the levels that V. moulinsiana can cope with. It is recommended that a further study of the drainage of the site is carried out with a view to restoring the necessary wetness to the habitat. In particular, the blockage of the lowered drain should be used as a management measure in order to halt the unfavourable condition that this site is in and to restore the habitat that is needed to support the species that the site is designated for"

The results from the 2010 survey show that the situation remains unchanged. Major effort would be required to return the site back into a wetland with the habitat that is able to support V. moulinsiana. Even if it could be restored, there is no nearby snail population from which Lisbigney may naturally recolonise. Thus a re-introduction programme would be necessary.

Monitoring recommendations:
Further monitoring or prescriptions for management are not merited until it is determined whether a restoration and re-introduction programme is possible.

Management recommendations:
Vertigo moulinsiana monitoring at Lisduff Fen

1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM16  County: Offaly
SAC Site Code: 002147  Lisduff Fen

1.2 General Habitat Description (from baseline survey):

The site comprises a wet calcareous fen, with typical fen and marsh species such as Black Bog-rush (Schoenus nigricans), Common Reed (Phragmites australis), Few-flowered Spike Rush (Eleocharis quinqueflora) and Grass of Parnassus (Parnassia palustris). EU habitats present at V. moulinsiana habitat are Alkaline fens: low sedge-rich communities (Annex I Habitat 7230), rich fens of CORINE 54.2 and fen-sedge beds of CORINE 53.3 (Romão, 1996; Devillers et al., 1991). They fall within the more general habitat of rich fen and flush (PF1) of Fossitt (2000). The areas that lie within a wider mosaic, but that form specific V. moulinsiana habitat fit the Rodwell M13 characteristic vegetation classification (Rodwell, 1991) within the Schoenetum nigricantis mire group, with Schoenus nigricans, Juncus articulatus, Briza media, Parnassia palustris and Juncus subnodulosus being most characteristic of positive habitat.

1.3 Definition of Vegetation Classes (from baseline survey):

Class I:  Schoenus nigricans
Class II: Phragmites australis, Carex rostrata, Carex viridula, Eriophorum spp. Equisetum fluviatile/palustre, Mentha aquatica
Class III: Molinia caerulea, Menyanthes trifoliata, Cladium mariscus
Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

Lisduff Fen is an important site - it supports both Vertigo moulinsiana and Vertigo geyeri (though only Vertigo moulinsiana was recorded in the current survey), and inhabited marsh fritillary (Euphrydas aurinia) larval webs were also recorded here as part of the current survey (apparently a new record). While the habitat appears to still be suitable for Vertigo moulinsiana across most of the habitat polygon, some declines were noted, with a cluster of negative samples towards the southern end. It is not clear why this apparent decline has occurred, and it may be due to natural population fluctuations, but given the drastic decline recorded for Vertigo geyeri at this site, it is important not to be complacent.

At first, the pressures and threats to the site appeared to be relatively limited, but given the declines recorded for the species, these impacts may be acting either more strongly or in combination to affect the site in ways that are not yet clearly apparent.

In terms of management, grazing levels are near ideal in the southern section of the fen. Activities happening directly adjacent to the fen, and relating to agriculture, may be combining to alter conditions in the fen just enough to make is less suitable to Vertigo geyeri, and may also, in time, affect Vertigo moulinsiana. These activities include scrub removal, silage production, water abstraction, drain modification, habitat reclamation and dumping of brash and spoil. While none are very dramatic if taken in isolation, all have the potential to negatively impact on the delicate balance that always exists in a calcareous fen. Silt run-off, chemical run-off, hydrological regime alteration, etc. may all be happening.

This is an important site, and action is needed to reduce the intensive agricultural activity happening within the SAC boundaries. It needs careful liaison with landowners, including time spent explaining the importance of the site as well as the rationale for management changes, and then dedicated monitoring when changes are implemented.

3. TRANSECT DETAILS

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4. RESULTS

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Transcet samples

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Vertigo moulinsiana monitoring at Lisduff Fen

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Vertigo moulingsiana monitoring at Lisduff Fen

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5. CONDITION ASSESSMENT

5.1 Population Assessment: 3 passes Favourable (green); 2 pass Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

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<td>Adult or sub-adult snails are present in at least 5 of the 9 sample sites in the northern half of the site</td>
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<td>25% of the samples have at least 5 individuals (minimum 40 samples)</td>
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5.2 Habitat Assessment: 4 passes Favourable (green); 2-3 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

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5.2.2 Site level

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Vertigo moulinsiana monitoring at Lisduff Fen

5.3 Future Prospects Assessment

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<td>Inside</td>
<td>Medium</td>
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<td>100%</td>
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<td>10%</td>
<td>Clearance of hawthorn and other scrub.</td>
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<td>garbage and solid waste</td>
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<td>Negative</td>
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<td>Dumping of brash and remains of cleared scrub.</td>
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<td>High</td>
<td>Negative</td>
<td>50%</td>
<td>Tractors pumping water from stream into tank. Permanent fixture.</td>
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Mon. period  Habitat Notes

2013-2018 The Vertigo moulinsiana habitat at Lisduff Fen comprised a 1.48ha area of Optimal and Sub-optimal habitat. The current survey found no overall change to the suitability of the habitat polygon. The vegetation and wetness continues to be suitable for supporting Vertigo moulinsiana. Based on the criteria of Moorkens & Killeen (2011), the Habitat Assessment for Lisduff Fen is Favourable (green).

2007-2012 Although it is fragmented and relatively small in extent, the suitable habitat at the site appears to be in good condition for V. moulinsiana.
Vertigo moulinsiana monitoring at Lisduff Fen

5.4 Overall Assessment

2013-2018 J02.07.01 groundwater abstractions for agriculture Outside Medium Negative 20% Drain clearance.

2013-2018 K02.01 species composition change Inside Low Negative 1% Seedlings of ash, sycamore, hazel, holly, oak.

2007-2012 A04.02.05 non intensive mixed animal grazing Inside Low Neutral 1.48ha The present low level of cattle and horse grazing is not having any impact (positive or negative) on the V. moulinsiana habitat, but would become negative if the level increased.

Mon. period Future Prospects Notes

2013-2018 The Future Prospects for Lisduff Fen following the 2007-2012 monitoring period were considered to be Favourable (green) with the only activity identified as occurring within the site being non-intensive mixed animal grazing. Mixed animal grazing (cattle and horses) continues across the habitat polygon, and is considered to be having a positive impact by keeping the vegetation relatively open and preventing the spread of scrub species, such as Gorse and Willow, as seen in areas to the north and east. The spread of trees such as Ash, Sycamore, Hazel, Holly and Oak into the fen was noted. Other, activities/threats noted directly adjacent to the fen include scrub clearance, dumping of brash and spoil, drain clearance, land ‘reclamation’, intensive agriculture including silage production, and water abstraction from the highly calcareous stream which flows into the fen at the southern tip. Taking into account all the various factors affecting Lisduff Fen, and the fact that the population of Vertigo geyeri at the site appears to have dropped sharply - perhaps an indication of subtle but important changes to the ecology of the site, the Future Prospects are considered to be Unfavourable Inadequate (amber).

2007-2012 As the impact is low, Future prospects have been assessed as Favourable

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: The Vertigo moulinsiana habitat is restricted to the wet calcareous fen with Schoenus nigricans at the southern part of the site. It is not a named feature of the SAC.

Discussion:

Lisduff Fen is an important site - it supports both Vertigo moulinsiana and Vertigo geyeri (though only Vertigo moulinsiana was recorded in the current survey), and inhabited marsh fritillary (Euphrydas aurinia) larval webs were also recorded here as part of the current survey (apparently a new record). While the habitat appears to still be suitable for Vertigo moulinsiana across most of the habitat polygon, some declines were noted, with a cluster of negative samples towards the southern end. It is not clear why this apparent decline has occurred, and it may be due to natural population fluctuations, but given the drastic decline recorded for Vertigo geyeri at this site, it is important not to be complacent.

At first, the pressures and threats to the site appeared to be relatively limited, but, given the declines recorded for the species, these impacts may be acting either more strongly or in combination to affect the site in ways that are not yet clearly apparent.

In terms of management, grazing levels are near ideal in the southern section of the fen. Activities happening directly adjacent to the fen, and relating to agriculture, may be combining to alter conditions in the fen just enough to make is less suitable to Vertigo geyeri, and may also, in time, affect Vertigo moulinsiana. These activities include scrub removal, silage production, water abstraction, drain modification, habitat reclamation and dumping of brash and spoil. While none are very dramatic if taken in isolation, all have the potential to negatively impact on the delicate balance that always exists in a calcareous fen. Silt run-off, chemical run-off, hydrological regime alteration, etc. may all be happening.
Vertigo moulinsiana monitoring at Lisduff Fen

This is an important site, and action is needed to reduce the intensive agricultural activity happening within the SAC boundaries. It needs careful liaison with landowners, including time spent explaining the importance of the site as well as the rationale for management changes, and then dedicated monitoring when changes are implemented.

Monitoring recommendations:
Given the apparent large decline in the population of Vertigo geyeri at this site, perhaps indicating ecological change, it is recommended that monitoring for Vertigo moulinsiana is carried out at a minimum of 3 yearly intervals. This is particularly important given that a decline in Vertigo moulinsiana at the southern end of the site was picked up in 2016. The monitoring regime needs to be reviewed frequently and should be re-assessed in light of any deterioration of condition or any changes to site management, or in the event of any further decline in the population. The monitoring should be carried out as per Moorkens & Killeen (2011):

- Take 3 samples at each from 9 locations with optimal habitat in the southern half of the site, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs
- Take 3 samples at each from 9 locations with optimal habitat in the northern half of the site, record as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal- Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
Useful notes on the management regime at the site can be found in Moorkens & Killeen (2011). These should be referred to in conjunction with the recommendations made below.

The habitat polygon for Vertigo moulinsiana is grazed by cattle and horses. The level of grazing is close to ideal for Vertigo geyeri, and it has been recommended that it should be maintained. This habitat type is not typical for Vertigo moulinsiana, which is more frequently found on tall sedges and other tall wetland plants, but here it appears to be supported adequately by the occurrence of Schoenus nigricans tussocks. Thus any changes in grazing/management regime should be mindful of this niche. Thus no change is recommended currently to grazing levels.

The scattered scrub in the fen is acceptable at current levels, but requires monitoring to identify if its spread needs to be addressed in the future. Should some scrub control be deemed necessary, this should be done with extreme care, and by hand. Access routes to the scrub should be chosen to avoid the best and most vulnerable areas of Vertigo moulinsiana habitat.

Management of areas directly adjacent to the fen (and lying within the Lisduff Fen 002147 SAC) are also of crucial importance. The removal of scrub and trees outside the fen, and the dumping of brash, should cease, as should dumping of spoil to the south of the site. The abstraction of water from the roadside section of the highly calcareous stream, which flows into the fen at the south of the site, should cease immediately, and the pipe that exists in the stream for easy attachment to tractors/tankers should be removed. Liaison with local landowners to make alternative arrangements and to explain the reason behind the change should be done immediately by local NPWS staff.

No further habitat modification (e.g. re-seeding, drain modification, scrub removal, etc.) should take place in the fields adjacent to the fen and lying with the SAC boundary. Again, liaison with the landowners concerned is needed immediately. Application of fertiliser or other chemicals associated with intensive farming (e.g. silage production in the south-eastern part of the site) should cease immediately within the SAC boundary.

This is an important site, and action is needed to reduce the intensive agricultural activity happening within the SAC boundaries. It needs careful liaison with landowners, including time spent explaining the importance of the site as well as the rationale for management changes, followed by dedicated monitoring when changes are implemented.
Vertigo mouinsiana monitoring at Lisduff Fen

2007-2012

**Area of occupancy:** The Vertigo mouinsiana habitat is restricted to the wet calcareous fen with Schoenus nigricans at the southern part of the site. It is not a named feature of the SAC.

**Discussion:**
This is a small site with a rather small amount of habitat (probably as little as 200m² is optimal). However, it is in good condition with a relatively good V. mouinsiana population. There are few threats - the Vertigo mouinsiana habitat is maintained by its high groundwater table from the springs along the western margin of the site. Lisduff Fen is also an unusual site for V. mouinsiana in that the snail is more or less found only on Schoenus nigricans tussocks in springs, rather than tall Carex species, Phragmites or Glyceria maxima at the edge of lakes or watercourses which would be more typical. To some extent this accounts for the generally low abundance of the snail: 123 adults and 256 juveniles were retrieved from 54 samples, with an average of 7 individuals per sample. The juvenile to adult ratio of 2.1 is typical of that found in autumn after the species' main breeding event.

**Monitoring recommendations:**
Although the Condition of the site, both in terms of habitat and Vertigo mouinsiana distribution and abundance, was assessed as Favourable, because the area of occupation and the good habitat is rather fragmented, it is recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

- Take 3 samples at each from 9 locations with optimal habitat in the southern half of the site, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. mouinsiana (adult & juvenile) and other molluscs
- Take 3 samples at each from 9 locations with optimal habitat in the northern half of the site, record as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. mouinsiana
- Use results to determine overall condition assessment

**Management recommendations:**
The management and recommendations are the same as for the site (for Vertigo geyeri) in 2005 (Moorkens 2006d).

**Existing Management**
Lisduff Fen is lightly grazed by cattle and horses that move freely into the fen from the fields above. This system of extensive grazing appears to be well established and is working well.

There are four landowners farming at Lisduff Fen. The north east area is not grazed much, but is not suitable habitat for the snail and is not an issue. The south east area has had some infilling in the early 1990s, where areas were dug, roots of trees removed and infilled, and this area now has some cattle grazing and some silage cutting. The main area of interest for V. mouinsiana is on the west of the fen. The north-west quadrant is lightly grazed by a few horses and ponies at present and by a small number of cattle in the summer. The south-west quadrant is on a long term lease since the late 1980s. It is currently managed by grazing, generally by two horses and by low numbers of cattle in dry spells of the summer.

**Proposed management prescription for site**
It is proposed that the current management regime of extensive cattle grazing continue for the next 5 years. There should be no lowering or intensifying of this regime. There should be no supplementary feeding of animals within the Vertigo mouinsiana habitat.

It is difficult to prescribe exact numbers of cattle or to assess the number of grazing days in the current regime. This is because animals are constantly being moved in and out of the grazing areas. Often cattle are not grazing for longer than two weeks at a time. This is because of the risk of tick infection and red water fever in the cattle, which can occur even in summer periods if the fen is excessively wet. If animal husbandry issues are limiting the grazing on the fen, then it is effectively acting as a better ecological control than exact number prescriptions would, as the conditions that promote red water fever risks would be the same as would promote excessive poaching if cattle were to remain in place.

Any further management to improve habitat for V. mouinsiana would be detrimental to the V. geyeri habitat. As both are in stable and sustainable condition at present, the status quo is suiting both species and should be maintained.
1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM17  County: Wicklow
SAC Site Code: 002249  The Murrough Wetlands

1.2 General Habitat Description (from baseline survey):

The general habitats in which Vertigo moulinsiana is present at The Murrough are vegetated ditches and pockets of sedge swamp habitat within larger scrub areas, and Cladium fen, marsh with permanent pools and Schoenus fen. The EU habitats that this relates to are water fringe vegetation comprising medium-tall waterside communities (CORINE 53.14) with some with some rich fen characteristics (CORINE 54.2, Annex I 7230) (Romão, 1996; Devillers et al., 1991) and Calcareous Fen with Cladium mariscus (HD Annex I Habitat 7210; CORINE 53.3). The snail is found typically on Typha angustifolia, Carex riparia, Carex rostrata, C. acutiformis in association with Equisetum fluviatile and Phragmites australis. The water table was above ground surface level but with a litter layer in very humid conditions above the water table. The specific areas that are within a wider mosaic, but that form specific V. moulinsiana habitat fit the M27 Rodwell characteristic vegetation classification (Rodwell, 1991). This falls within the more general habitat of reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Tall Carex species, Phragmites australis
Class II: Cladium mariscus, Carex paniculata, Schoenus nigricans, Glyceria maxima
Class III: Iris pseudacorus, Typha angustifolia, Sparganium erectum, Schoenoplectus
Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

This is a very important site, being the only east coast site for Vertigo moulinsiana in Ireland. The population of Vertigo moulinsiana at The Murrough, within the original area defined by Moorkens & Killeen (2011) (Polygons A and B), has shown some decline. The habitat here is subject to various pressures including pony grazing, drying out and scrub encroachment. Additional polygons have been added to the north (Polygon C) and to the south (D and E) of these. It is in Polygons D and E that the highest numbers of Vertigo moulinsiana have been found. In these areas management is for hunting/shooting, and also cattle grazing, and it is, broadly speaking, appropriate for the species. Given the numbers of the target species found, particularly when compared to all previous surveys at Five Mile Point, it would appear that this is the core of the population at The Murrough. Further investigations to the south of this area may reveal further habitat that supports the species.

It should be noted that in Long & Brophy (2013) a different polygon naming system was used to that employed here.

3. TRANSECT DETAILS

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Vertigo mouliniana monitoring at The Murrough

4. RESULTS

Polygon habitat characteristics

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<td>Polygon A status remains Suboptimal-Unsuitable. This is an area of fen which is grazed tight by ponies in places, but has scrub encroaching in others. Some areas are wet, particularly near drains, but mostly the ground is quite dry underfoot.</td>
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<td>Polygon B status was upgraded from Suboptimal (Moorkens &amp; Killeen, 2011) to Optimal-Suboptimal. This is noted as a change in interpretation, rather than an ecological change. The area is very wet in places, and so parts are inaccessible, but appear likely to support pockets of habitat (e.g. tall sedges) suitable for Vertigo mouliniana.</td>
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<td>Polygon C was created by Long &amp; Brophy (2013), and the boundary was expanded in 2016. The status was dropped from Optimal-Suboptimal to Suboptimal for reasons of interpretation, as the boundary was expanded to include additional habitat. This is an area of fen with scrub encroaching in places, but also with wet areas with Schoenus nigricans, Molinia caerulea and reeds, grading into an area dominated by Cladium mariscus at the northern end.</td>
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<td>Polygon E is a new polygon created during the 2016 survey, which was classed as Optimal-Suboptimal. It consists of a large area of tall-growing vegetation (mainly reeds), which appears to be managed for hunting/shooting.</td>
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### Vertigo moulinsiana monitoring at The Murrough

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5. CONDITION ASSESSMENT

5.1 Population Assessment: 3 passes Favourable (green); 1-2 pass Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

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<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
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<th>Result</th>
<th>Pass/Fail</th>
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<tbody>
<tr>
<td>2013-2018</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in at least 5 samples (or 25% - minimum 20 samples) with a geographical spread on the north side of the road at Five Mile Point (= sites 1-9 Polygons A and C)</td>
<td>Present in 1 sample (3%)</td>
<td>Fail</td>
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<th>Result</th>
<th>Pass/Fail</th>
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<td>2013-2018</td>
<td>Presence/Absence1</td>
<td>Adult or sub-adult snails are present in at least 5 samples (or 25% - minimum 20 samples) with a geographical spread in Polygons D and E</td>
<td>Present in 10 samples</td>
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Vertigo moulinsiana monitoring at The Murrough

5.2 Habitat Assessment:

5.2.1 Transect level

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<th>Target</th>
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5.2.2 Site level

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<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>At least 6ha of the site sub-optimal with optimal areas</td>
<td>6.4 ha sub-optimal</td>
<td>Pass</td>
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<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>At least 6ha of the site sub-optimal with optimal areas</td>
<td>6.4 ha sub-optimal</td>
<td>Pass</td>
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5.2.3 Population Notes

2013-2018 In the monitoring period 2007-2012, Vertigo moulinsiana were found in nine out of 27 samples to the north of the road at Five Mile Point. In the monitoring period 2013-2018, Vertigo moulinsiana was found in one sample out of 30 to the north of the road, illustrating a decline. For the area south of the road, the species was found in eight out of 15 samples in 2007-2012. In the monitoring period 2013-2018, Vertigo moulinsiana was found in one sample out of 20 within the same area. However, sampling by Long & Brophy (2013) extended the known area of distribution of Vertigo moulinsiana further south at the site, and sampling in this extended area in the current survey recorded the species at two locations (out of three) with 10 positive samples (out of 15), and in good numbers. Based on the current criteria of Moorkens & Killeen (2011), and with an additional criterion added to take account of the new polygons (D and E), the Population Assessment for The Murrough is Unfavourable Inadequate (amber).

2007-2012 the snail is scattered in its distribution but present in rather low numbers

5.2.4 Habitat extent

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<th>Indicator</th>
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<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>Over 75% of the samples (minimum 20) at sites on the north side of the road at Five Mile Point (= sites 1-9 Polygons A and C) are dominated by suitable vegetation (Classes I &amp; II) AND fall within soil moisture classes 3-5</td>
<td>100% dominated by suitable vegetation and 45% fall within soil moisture classes 3-5</td>
<td>Fail</td>
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<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>Over 75% of the samples (minimum 20) at sites on the south side of the road at Five Mile Point (= sites 10-13 Polygon B) are dominated by suitable vegetation (Classes I &amp; II) AND fall within soil moisture classes 3-5</td>
<td>85% dominated by suitable vegetation and 95% fall within soil moisture classes 3-5</td>
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<td>2013-2018</td>
<td>Habitat extent</td>
<td>Over 75% of the samples (minimum 20) in Polygons D and E are dominated by suitable vegetation (Classes I &amp; II) AND fall within soil moisture classes 3-5</td>
<td>95% dominated by suitable vegetation and 100% fall within soil moisture classes 3-5</td>
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Vertigo moulinsiana monitoring at The Murrough

5.3 Future Prospects Assessment

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<th>Activity description</th>
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<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
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<td>2013-2018</td>
<td>A03</td>
<td>mowing / cutting of grassland</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>10%</td>
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<tr>
<td>2013-2018</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Positive</td>
<td>10%</td>
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<tr>
<td>2013-2018</td>
<td>F06</td>
<td>Hunting, fishing or collecting activities not referred to above</td>
<td>Inside</td>
<td>Low</td>
<td>Positive</td>
<td>10% Minimal management with mown strips at high level</td>
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<td>2013-2018</td>
<td>G05.07</td>
<td>missing or wrongly directed conservation measures</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>2% Overgrazing by ponies in small area of Birdwatch Ireland reserve</td>
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<td>2013-2018</td>
<td>K04.05</td>
<td>damage by herbivores (including game species)</td>
<td>Inside</td>
<td>Low</td>
<td>Positive</td>
<td>75% Very small impact of deer trampling across site</td>
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<tr>
<td>2007-2012</td>
<td>A04.02.01</td>
<td>non intensive cattle grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Neutral</td>
<td>6.36ha Cattle have access to all of the potential habitat on the south side of the road but given that the site is so wet (which means the cattle tend not to poach much of the good habitat), and the head numbers are relatively low, the impact of non intensive cattle grazing is considered to be neutral.</td>
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<tr>
<td>2007-2012</td>
<td>A04.02.03</td>
<td>non intensive horse grazing</td>
<td>Inside</td>
<td>Low</td>
<td>Positive</td>
<td>3.07ha Abandonment has been compensated for by the introduction of pony grazing (plus significant mechanical scrub clearance) which is considered a positive impact.</td>
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Moorkens & Killeen (2011) identified two polygons which support some suitable habitat for Vertigo moulinsiana at The Murrough. Polygon A to the north of the road at Five Mile Point, which was Sub-optimal and Unsuitable, and Polygon B to the south of the road at Five Mile Point, which was Suboptimal. Following surveys by Long & Brophy (2013) and the current survey, three additional polygons with suitable habitat were added - Polygon C to the north, and polygons D and E to the south. Based on the criteria of Moorkens & Killeen (2011), with an additional criterion added to take account of new areas added at the south, the Habitat Assessment for The Murrough is Unfavourable Inadequate (amber).

Much of the habitat at the site appears to be in good condition for V. moulinsiana.
5.4 Overall Assessment

- **Mon. period** 2013-2018
- **Population assessment** Amber
- **Area of suitable habitat** Amber
- **Future prospects** Amber
- **Overall assessment** Amber

- **Mon. period** 2007-2012
- **Population assessment** Green
- **Area of suitable habitat** Green
- **Future prospects** Green
- **Overall assessment** Green

### 6. DISCUSSION

**Monitoring period**

- **2013-2018**

**Area of occupancy:** The habitat that supports Vertigo moulinsiana within this site is areas of fen and swamp on the north and south sides of the road leading to Five Mile Point. Access is from this road and by walking southwards along the shoreline and railway track for the most southerly areas.

**Discussion:**

This is a very important site, being the only east coast site for Vertigo moulinsiana in Ireland. The population of Vertigo moulinsiana at The Murrough, within the original area defined by Moorkens & Killeen (2011) (polygons A and B), has shown some decline. The habitat here is subject to various pressures including pony grazing, drying out and scrub encroachment. Additional polygons have been added to the north (Polygon C) and to the south (D and E) of these. It is in polygons D and E that the highest numbers of Vertigo moulinsiana have been found. In these areas management is for hunting/shooting, and also cattle grazing, and it is, broadly speaking, appropriate for the species. Given the numbers of the target species found, particularly when compared to all previous surveys at Five Mile Point, it would appear that this is the core of the population at The Murrough. Further investigations to the south of this area may reveal further habitat that supports the species. If this is the case, then the Future Prospects for Vertigo moulinsiana population at The Murrough is rated as Unfavourable Inadequate (amber).

It should be noted that in Long & Brophy (2013) a different polygon naming system was used to that employed here.
Vertigo moulinsiana monitoring at The Murrough

- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

The opportunity should also be taken to survey new areas to the south of polygons D and E to improve the knowledge of the population of Vertigo moulinsiana at The Murrough.

Management recommendations:

Given the large extent of the site, the management recommendations vary in different areas. In Polygon A, the grazing by ponies should be closely monitored and prevented from having a negative effect on suitable Vertigo moulinsiana habitat. This almost certainly involves reducing the current grazing impact - either through lesser numbers of grazers, or removal of grazers for periods of the year. Some further scrub clearance and rewetting (if possible) would also benefit the species in this area. However, this of course needs to be weighed against the other conservation priorities at the site. Polygon C, particularly the southern section, is suffering from abandonment and lack of grazing, and would benefit from the introduction of light grazing - however this would need to be carefully monitored. While BirdWatch Ireland staff are aware of the presence of the species at their reserve, liaison should be initiated with the manager of the ‘East Coast Nature Reserve’ immediately in order to inform any plans for managing the areas.

In Polygon B, the current grazing level is considered appropriate for maintaining the habitat. In Polygon D, mowing to a low vegetation height in the vicinity of the large drain should be stopped if possible, to allow tall wetland vegetation to develop once again. Mowing (at a level of ~1m) and cattle grazing occurs in Polygon E, and some of this area would benefit from a reduction in both; however a mosaic of grazing and management effects occurs, which at current levels allows good areas of suitable habitat to persist. It is likely that management in Polygon D is for agricultural purposes, and in Polygon E is for shooting/hunting purposes. Local NPWS staff should endeavour to contact landowners/users of the area, both to inform them of the presence of the rare and protected species on their land, and also to discuss management, both current and future.
Area of occupancy: The habitat that supports Vertigo moulinsiana within this site is areas of fen and swamp on the north and south sides of the road leading to Five Mile Point. Access is from this road.

Discussion:
Vertigo moulinsiana was confirmed living at The Murrough for the first time in over 50 years, close to the location given by Stelfox in 1954. With the information gathered during the 2010 survey, the Condition of the site has been assessed as Favourable. This is an important site for the species as it is the only known site on the east coast of Ireland, and therefore significant in terms of national Range but also the area of occupancy appears to be relatively large.

Much of the habitat on the south side of the road was inaccessible due to high water levels at the time of survey (early November 2010). Whilst the entire habitat has been identified as potentially suitable for V. moulinsiana (sub-optimal), a more thorough survey should be carried out in drier conditions to determine the full distribution and abundance of the snail.

Parts of the habitat on the north side of the road were also inaccessible but this was mainly due to scrub and density of suitable habitat. It is likely that this part of the site had deteriorated over the last 25 years due to scrub invasion and subsequent drying. However, it may improve following the recent programme of scrub clearance and introduction of pony grazing.

Vertigo moulinsiana was not found at any other locations other than at Five Mile Point. Potentially suitable habitat was identified at other places throughout the Murrough but a combination of factors such as hydrogeology, and current and past management are likely reasons for the absence of the snail.

Monitoring recommendations:
Although the Condition of the site, both in terms of habitat and Vertigo moulinsiana distribution and abundance has been assessed as Favourable, it is recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed after a more detailed survey has been carried out and also in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2013
Methods (see Section 4 of main report for full details). Prescription as follows:
- Take a minimum of 30 samples in total from at least 6 separate locations with optimal habitat to the north of the road at Five Miler Point, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs
- Take a minimum of 30 samples in total from at least 6 separate locations with optimal habitat to the south of the road at Five Miler Point, record as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

A more thorough survey should be carried out on the south side of the road at Five Mile Point in drier conditions to determine the full distribution and abundance of the snail.

Management recommendations:
Existing Management

There has been extensive scrub clearance in the fen on the north side of the road and the site is now being grazed by ponies. It is not known if the clearance work has finished or is to continue. The fen on the south side of the road is grazed by cattle.

Proposed management prescription for site

It is recommended that the present management in both areas of habitat at Five Mile Point continues at present until more information is obtained on the full extent of the Vertigo moulinsiana population.
Vertigo moulinsiana monitoring at Pollardstown Fen

1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM18 County: Kildare
SAC Site Code: 000396 Pollardstown Fen

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>5 September &amp; 1 October 2014</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>12 September 2010</td>
<td>Evelyn Moorkens &amp; Ian Killeen</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

The general habitat in which Vertigo moulinsiana is present at Pollardstown Fen is Calcareous Fen (HD Annex I Habitat 7230; CORINE 54.2), Calcareous Fen with Cladium mariscus (HD Annex I Habitat 7210; CORINE 53.3), petrifying springs with tufa formation (HD Annex I Habitat 7220; CORINE 54.12), ditch and waterside communities including most communities of CORINE 53 (Romão, 1996; Devillers et al., 1991). The snail is widespread around the wetter ditch areas, becoming less dense as habitat becomes drier away from saturated groundwater. The specific areas that are within a wider mosaic, but that form specific V. moulinsiana habitat fit the Cladium and Schoenus communities of M13, Filipendula mire of the M27 and the tall Carex M9 Rodwell characteristic vegetation classification (Rodwell, 1991). This falls within the more general habitat of rich fen and flush (PF1), reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

| Class I: Tall Carex species, Schoenus nigricans, Phragmites australis |
| Class II: Cladium mariscus, Equisetum fluviatile |
| Class III: Juncus subnodulosus, Menyanthes trifoliata, Mentha aquatica, Angelica sylvestris |
| Class IV: All other species |

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

Vertigo moulinsiana is present all across this site, albeit in low numbers in places. All six polygons sampled in 2014 were positive for the species. However, numbers of individuals recorded were much lower than in the previous survey (2010). This is particularly evident on the transect where hundreds of individuals were counted in 2010, but only one adult was found in 2014. It is much more difficult to draw comparisons across the remainder of the site – Polygon B had good results (though lower abundances) in 2014; all other areas were not sampled in 2010. Overall, there is some evidence to suggest that both drying out and vegetation change caused by lack of grazing may both be occurring in parts of this site. Recommendations for both of these issues have been made, and recommendations in Moorkens and Killeen (2011) still stand also. The dry year in 2014 may also have had an impact on numbers of snails recorded. Because this is such an important site, and there are a number of unknowns, it is crucially important that this site be re-surveyed in three years’ time.

3. TRANSECT DETAILS

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<tr>
<td>End point: N 76417 15964</td>
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<td>Description: Sampling frequency:</td>
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4. RESULTS

Polygon habitat characteristics

Monitoring Period: 2013-2018

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<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
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<tbody>
<tr>
<td>A</td>
<td>Optimal-Suboptimal</td>
<td>3.908</td>
<td>Polygon A status remains Optimal-Suboptimal. The habitat comprises tall-reed swamp dominated by Phragmites australis, as well as areas of lower-growing fen vegetation with Juncus spp. and Schoenus nigricans. The boundary was redrawn to better reflect the extent of the habitat and the boundary features on the ground.</td>
</tr>
<tr>
<td>B</td>
<td>Optimal-Suboptimal</td>
<td>2.4895</td>
<td>Polygon B status remains Optimal-Suboptimal. The habitat is dominated by tall Carex species. The boundary was redrawn to better reflect the extent of the habitat and the boundary features on the ground.</td>
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<tr>
<td>C</td>
<td>Not visited 2014</td>
<td>0.8755</td>
<td>Polygon C was not visited in 2014.</td>
</tr>
<tr>
<td>D</td>
<td>Suboptimal- Unsuitable</td>
<td>0.477</td>
<td>Polygon D status has decreased from Sub-optimal to Suboptimal- Unsuitable due to an apparent change in vegetation. The habitat is now wet grassland dominated by Cladium mariscus and Phragmites australis.</td>
</tr>
<tr>
<td>F</td>
<td>Suboptimal</td>
<td>9.7503</td>
<td>Polygon F status remains Suboptimal. Polygon E was merged with Polygon F due to the similarity of the habitat present, which consisted of tall reed swamp containing a mosaic of Cladium mariscus and Phragmites australis, grading into lower fen vegetation.</td>
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<td>G</td>
<td>Not visited 2014</td>
<td>1.644</td>
<td>Polygon G was not surveyed in 2014.</td>
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<tr>
<td>H</td>
<td>Suboptimal- Unsuitable</td>
<td>2.9562</td>
<td>Polygon H status has decreased from Sub-optimal to Suboptimal- Unsuitable due to it being too dry and grassy. The habitat includes areas of tall reed swamp with Cladium mariscus and Phragmites australis. The boundary was redrawn to better reflect the habitat and boundary features on the ground.</td>
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<td>I</td>
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<td>Polygon I status remains Suboptimal. Polygon J was merged with Polygon I due to the similarity of the habitat present, which is tall reed swamp dominated by Phragmites australis.</td>
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<td>K</td>
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Monitoring Period: 2007-2012

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<th>Area (ha)</th>
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<tr>
<td>A</td>
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<td>17.43</td>
<td>All other areas - Wide range of habitats with V. moulinsiana habitat including ditches, open fen and flushes, with Schoenus, tall Carex spp. and Cladium</td>
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<td>Suboptimal with optimal areas</td>
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<td>Polygon A - Network of ditches and wet Schoenus-dominated fen</td>
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<tr>
<td>B</td>
<td>Suboptimal with optimal areas</td>
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<td>Polygon B - Flush area with dense stands of Carex acutiformis</td>
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Transect samples

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<th>Wetness</th>
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Vertigo moulinsiana monitoring at Pollardstown Fen

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Spot Samples

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### 5. CONDITION ASSESSMENT

#### 5.1 Population Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

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<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
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<tr>
<td>2013-2018</td>
<td>1</td>
<td>Density</td>
<td>At least 7 (50% of a minimum of 15) samples on Transect 1 should have &gt;20 V. moulinsiana individuals</td>
<td>No samples on Transect 1 have &gt;20 V. moulinsiana individuals</td>
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<td>1</td>
<td>Presence/Absence</td>
<td>V. moulinsiana is present in 11 samples (or 75% of a minimum of 15 samples) on Transect 1</td>
<td>V. moulinsiana is present in 1 sample (or 7% of 15 samples) on Transect 1</td>
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<td>Density</td>
<td>At least 7 (50% of a minimum of 15) samples on Transect 1 should have &gt;20 V. moulinsiana individuals</td>
<td>9 samples with &gt;20 individuals</td>
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<td>Presence/Absence</td>
<td>V. moulinsiana is present in 11 samples (or 75% of a minimum of 15 samples) on Transect 1</td>
<td>Present in 13 samples</td>
<td>Pass</td>
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<table>
<thead>
<tr>
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<th>Result</th>
<th>Pass/Fail</th>
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</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Area of occupancy</td>
<td>Adult or sub-adult snails are present in 9 out of 15 sample locations from across the site and this must include at least 3 positive samples from Polygon B.</td>
<td>Present in 7 out of 15 sample locations, including 2 from Polygon B.</td>
<td>Fail</td>
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Vertigo moulinsiana monitoring at Pollardstown Fen

5.2 Habitat Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

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<tr>
<th>Mon. period</th>
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<th>Indicator</th>
<th>Target</th>
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<th>Pass/Fail</th>
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<tr>
<td>2013-2018</td>
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<td>Habitat extent</td>
<td>Over 75% of the samples on Transect 1 are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>33% of the samples on Transect 1 are dominated by suitable vegetation (Classes I &amp; II)</td>
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<td>Habitat quality</td>
<td>Over 75% of the samples on Transect 1 fall within soil moisture classes 3-5</td>
<td>100% of the samples on Transect 1 fall within soil moisture classes 3-5</td>
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<td>Habitat extent</td>
<td>Over 75% of the samples on Transect 1 are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>93% of samples</td>
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<td>2007-2012</td>
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<td>Habitat quality</td>
<td>Over 75% of the samples on Transect 1 fall within soil moisture classes 3-5</td>
<td>100% of samples</td>
<td>Pass</td>
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5.2.2 Site level

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<td>2013-2018</td>
<td>Habitat extent</td>
<td>Over 80% of the sample locations across the site are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5, and this must include 3 sample locations in Polygon B.</td>
<td>47% (7 out of 15) sample locations dominated by suitable vegetation and fall within the moisture classes 3-5</td>
<td>Fail</td>
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<td>2007-2012</td>
<td>Habitat extent</td>
<td>Over 80% of the samples at site 1 are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5</td>
<td>100%</td>
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5.3 Future Prospects Assessment

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<td>A04.03</td>
<td>abandonment of pastoral systems, lack of grazing</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
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<td>2013-2018</td>
<td>H07</td>
<td>Other forms of pollution</td>
<td>Inside</td>
<td>Low</td>
<td>Negative</td>
<td>1%</td>
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Vertigo moulinsiana monitoring at Pollardstown Fen

5.4 Overall Assessment

Mon. period | Population assessment | Area of suitable habitat | Future prospects | Overall assessment
--- | --- | --- | --- | ---
2013-2018 | Red | Red | Amber | Red
2007-2012 | Green | Green | Green | Green

Mon. period | Overall Notes
--- | ---
2013-2018 | The negative changes in relation to population and habitat suitability result, as well as decreased Future Prospects, result in an Overall Assessment for Pollardstown Fen of Unfavourable Bad (red).
2007-2012 | 

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: As in 2007-2012, the habitat that supports Vertigo moulinsiana within this cSAC is the tall fen habitat including shallow ditches from the fen margin into the centre of the fen. Access is from the public entrance at the south of the fen.
Vertigo moulinsiana monitoring at Pollardstown Fen

Discussion:
Vertigo moulinsiana is present all across this site, albeit in low numbers in places. All six polygons sampled in 2014 were positive for the species. However, numbers of individuals recorded were much lower than in the previous survey (2010). This is particularly evident on the transect where hundreds of individuals were counted in 2010, but only one adult was found in 2014. It is much more difficult to draw comparisons across the remainder of the site - Polygon B had good results (though lower abundances) in 2014; all other areas were not sampled in 2010. Overall, there is some evidence to suggest that both drying out and vegetation change caused by lack of grazing may both be occurring in parts of this site. Recommendations for both of these issues have been made, and recommendations in Moorkens and Killeen (2011) still stand also. The dry year in 2014 may also have had an impact on numbers of snails recorded. Because this is such an important site, and there are a number of unknowns, it is crucially important that this site be re-surveyed in three years’ time.

Monitoring recommendations:
Due to the overall assessment for Pollardstown Fen of Unfavourable Bad (red), monitoring should be carried out on a 3 yearly basis, as per the recommendations of Moorkens & Killeen (2011):
- Repeat Transect 1. In field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 15 samples
- Take 15 samples from other locations within the site, at least 3 to be in Polygon B, record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal Sub-optimal, Suboptimal, Suboptimal- Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
Soil wetness is a critical factor in maintaining habitat suitability for Vertigo moulinsiana and drying out appears to be an issue in some areas of Pollardstown Fen, in conjunction with succession/vegetation change. Action should be taken to maintain water levels within the fen. This may include the partial or complete blocking of drains and the downstream management of the Milltown Feeder to maintain higher water levels in the fen. It is possible that the apparent drying out is due to annual variations in rainfall and this should be borne in mind during future monitoring surveys.

Based on conversations with local NPWS staff and landowners, as well as the notes provided in Moorkens & Killeen (2011), there has almost certainly been a decrease in grazing across much of this site. Goats and the occasional, and temporary, escapees (cattle, horses, sheep) seem to have, in the past, fulfilled an important function through their ad hoc grazing. It would appear that this does not happen at the site now and the signs of a lack of grazing are evident in many places (e.g. dense mats of Juncus subnodulosus or large tussocks of sedges/grasses). A monitored grazing regime needs to be introduced, but (and in particular for Vertigo moulinsiana) this should avoid the wettest areas and areas by drains. The prescriptions given in Moorkens & Killeen (2011) should also be referred to.
Vertigo moulinsiana monitoring at Pollardstown Fen

Area of occupancy: The habitat that supports Vertigo moulinsiana within this CSAC is the tall fen habitat including shallow ditches from the fen margin into the centre of the fen. Access is from the public entrance at the south of the fen.

Discussion:
Pollardstown Fen is currently in excellent condition for Vertigo moulinsiana. If the fen was to be maintained solely for the conservation of this species, it would be quite easy, as the snail favours wet, humid conditions in ungrazed tall vegetation habitats. However, Pollardstown Fen is a very important site for a number of Annex I habitats and Annex II species. Species such as V. geyeri require short open alkaline fen habitat, dominated by yellow Carex species and brown mosses, and these are generally best managed by sheep grazing, so some compromise in management between the two qualifying features is needed. In the best habitats for these species, they rarely coincide in area of occupancy, except in very wet conditions when V. moulinsiana spreads over shorter vegetation. Vertigo moulinsiana is less demanding in constancy of supply of water compared with V. geyeri, yet it will live in wetter conditions than the latter if there is enough build up of litter, as is has good climbing abilities. It can also live in drier conditions than V. geyeri if there is enough humidity in autumn to allow it to climb and reproduce. The very favourable conditions therefore at Pollardstown must be taken in the context that a spread of V. moulinsiana into habitat formally occupied by V. geyeri can be a negative trend that indicates an active transition towards drier conditions which would ultimately end up with the collapse both snail populations. There is evidence that some negative changes have occurred at the southern margin of the fen. However, in the V. moulinsiana habitat to the north and more central areas of the fen there does not appear to be any tendency towards succession to dryness. Due to the importance of the fen internationally and the fact that the species can be rapidly lost from sites when the groundwater recedes below surface levels, regular monitoring is recommended. Ongoing interpretation of the changes in the populations of the Habitats Directive Annex II Vertigo species have been aided by studies over the last 10 years as part of the Kildare Town Bypass project (e.g. Anon., 2004). These have included regular groundwater monitoring across the fen, which currently indicate that water levels are suitable for V. moulinsiana occur.

Monitoring recommendations:
Although Pollardstown Fen has been assessed as Favourable, both in terms of habitat and Vertigo moulinsiana distribution and abundance, it is still recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed in light of any deterioration of Condition or any changes to site management:

Frequency: Next monitoring due 2011
Methods (see Section 4 of main report for full details). Prescription as follows:
- Repeat transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 15 samples
- Take 10 samples from Site 1 of this survey, record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

Additional surveillance at 6 yearly intervals:

Frequency: Next monitoring due 2011
Methods (see Section 4 of main report for full details)\textsuperscript{3} Prescription as follows:
- In all other polygon areas not covered by the regular monitoring - Take 5 samples at each from at least 3 other locations with optimal habitat within each polygon areas at the site, record information as above

Management recommendations:
Existing Management
Polygon Area A is intermittently grazed by cattle and sheep, for no more than 2 weeks of cattle grazing and occasional wandering sheep grazing in any one year. Polygon area B has occasional cattle grazing and some horse grazing by wandering individual animals. Most other areas on the south side of the main feeder have been ungrazed for 20 years, apart from occasional wandering goats. The area at the northern end is largely ungrazed except for occasional wandering livestock. The main block on the north side of the main feeder has had extensive low density sheep grazing until 2006, when cattle were introduced for summer and autumn grazing. The remaining ditch habitats are unaffected by grazing.

Proposed management prescription for site
The management requirements at Pollardstown Fen for V. moulinsiana are largely dependant on the ability of the habitat to be maintained by wetness alone. The ditch areas and their immediate surroundings do not need grazing, and animals tend to avoid these areas at wet times, but at very dry times the succulent wet ditch areas can prove very attractive to a group of grazers that could otherwise be more extensively distributed. The current levels of grazing in different management blocks is not causing any damage to the snail.

The best management for V. moulinsiana is by wetness, where water levels are wet enough to prevent succession of habitat. The species is best managed in areas that are completely free of grazing animals, as the vegetation needs to remain high and very wet during the climbing season (Spring to Autumn). Where grazing is needed for other purposes (e.g. for nearby V. geyeri habitats), the very vulnerable wet areas of V. moulinsiana habitat may need to be fenced off during dry periods.
Vertigo moulinsiana monitoring at Pollardstown Fen

The management prescription for 2010 - 2013 is therefore no introduction of further active grazing management for V. moulinsiana, but if the area needs grazing to be introduced for other purposes, its effects on V. moulinsiana should be monitored and temporary fencing introduced where necessary.
Site report - Vertigo Monitoring

Vertigo moulinsiana monitoring at Portumna

1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM19  County: Galway
SAC Site Code: 002241  Lough Derg, North-East Shore

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>26-27 October 2016</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1 November 2010</td>
<td>Ian Killeen &amp; Maria Long</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

The general habitat in which Vertigo moulinsiana is present at Portumna is a fringe area of swamp fen at the edge of Lough Derg. The EU habitats that this relates to are water fringe vegetation comprising medium-tall waterside communities (CORINE 53.14) with some with some rich fen characteristics (CORINE 54.2, Annex I 7230) (Romão, 1996; Devillers et al., 1991). The snail is found typically on Typha angustifolia, Carex riparia, Carex rostrata, C. acutiformis in association with Equisetum fluviatile and Phragmites australis. The water table was above ground surface level but with a litter layer in very humid conditions above the water table. The specific areas that are within a wider mosaic, but that form specific V. moulinsiana habitat fit the M27 Rodwell characteristic vegetation classification (Rodwell, 1991). This falls within the more general habitat of reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Tall Carex species, Glyceria maxima, Phragmites australis
Class II: Cladium mariscus, Carex rostrata, Equisetum fluviatile
Class III: Carex paniculata, Mentha aquatica, Schoenus nigricans, Typha angustifolia, Sparganium erectum
Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

The habitats of the northern areas of lakeshore of Lough Derg, and its hinterland, supports abundant suitable habitat for Vertigo moulinsiana in the form of fens and reedbeds, including areas forming a mosaic with the woodland habitats of Portumna Forest Park. The species continues to be widely present within the original area surveyed by Moorkens & Killeen (2011), and has also been found further south on the eastern shores of Lough Derg by Long & Brophy (2013) and again in the current survey. Further exploratory surveys would be likely to extend the range still further, on both the east and west shores of the lake – though much of the habitat is difficult to access (often consisting of floating vegetation, and/or deep standing water, or located beyond impassable drains/channels). While the water levels of Lough Derg are regulated by the ESB at Parteen Weir, balancing various social, economic and ecological pressures, flooding can be an issue on the lake and this may impact on the Vertigo moulinsiana habitat. In the longer term, the proposed extraction of water from Lough Derg to supply the Greater Dublin Area, is something which has the potential to affect the Vertigo moulinsiana habitat and should be closely monitored. Overall, this is a very important site for this species given its scale and the scope for further expansion of the known range of the species there.

3. TRANSECT DETAILS

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<tr>
<th>TRANSECT</th>
<th>MONITORING PERIOD</th>
<th>Start point</th>
<th>End point</th>
<th>Transect length</th>
<th>Direction</th>
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Sampling frequency: Approximately every 10-25m
4. RESULTS

Polygon habitat characteristics

Monitoring Period: 2013-2018

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<tr>
<th>Polygon</th>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Optimal</td>
<td>2.0923</td>
<td>Polygon A status was classed as Suboptimal by Moorkens &amp; Killeen (2011), while Long &amp; Brophy (2013) classed it as Optimal. Similarly, it has been classed as Optimal in the current survey. There does not appear to have been an ecological change, and so it is likely to be due to interpretation. Interestingly, Moorkens &amp; Killeen (2011) noted suitable vegetation as well as wetness at all nine of their sample points in this polygon. This polygon consists of tall, wet swamp vegetation for the most part. (Note that for many polygons at this site, new letters were assigned in Long &amp; Brophy (2013) due to significant changes and additions to the known area of occupation of the snail in the area. These have mostly not been retained here, but instead we reverted to follow Moorkens &amp; Killeen (2011), to allow for easiest comparison with that study.)</td>
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<td>B</td>
<td>Optimal-Suboptimal</td>
<td>0.2552</td>
<td>Polygon B status remains Optimal-Suboptimal.</td>
</tr>
<tr>
<td>C</td>
<td>Optimal-Suboptimal</td>
<td>0.4525</td>
<td>Polygon C status remains Optimal-Suboptimal.</td>
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<tr>
<td>D</td>
<td>Optimal</td>
<td>0.2066</td>
<td>Polygon D is a new polygon created by Long &amp; Brophy (2013). It was classed as Optimal, and remains Optimal in the current survey. It consists of a fringe of floating species-rich reed bed on the bank of the River Shannon, where it enters Lough Derg.</td>
</tr>
<tr>
<td>E</td>
<td>Suboptimal</td>
<td>0.6191</td>
<td>Polygon E is a new polygon created by Long &amp; Brophy (2013) (though labelled Polygon A in that survey). It was classed as Suboptimal. This polygon was not visited in the current survey due to access permission issues. It consists of an area of reed bed.</td>
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<tr>
<td>F</td>
<td>Optimal-Suboptimal</td>
<td>0.24</td>
<td>Polygon F is a new polygon created by Long &amp; Brophy (2013) and was classified as Suboptimal. This has increased to Optimal-Suboptimal in the current study, due to being quite wet and dominated by Class II vegetation. This is likely to be a change in interpretation rather than ecological change. It consists of drains and depressions filled with tall-growing vegetation.</td>
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<td>G</td>
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<td>2.2462</td>
<td>Polygon G is a new polygon created by Long &amp; Brophy (2013), and was classed as Suboptimal. This polygon was not visited in the current survey due to access permission issues. It consists of an area of reed bed.</td>
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<td>H</td>
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<td>0.2968</td>
<td>Polygon H is a new polygon created by Long &amp; Brophy (2013), and was classed as Suboptimal. It remains Suboptimal in the current study. It is a patch of wet ground with tall growing sedges and reeds in a woodland clearing.</td>
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<td>I</td>
<td>Suboptimal- Unsuitable</td>
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<td>Polygon I is a new polygon created by Long &amp; Brophy (2013), and was classed as Suboptimal- Unsuitable. It remains Suboptimal- Unsuitable in the current study.</td>
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<td>J</td>
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<td>3.1296</td>
<td>Polygon J is a new polygon created by Long &amp; Brophy (2013) (though labelled Polygon B in that survey), and was classed as Suboptimal. It remains Suboptimal in the current study. It consists of species-rich reed bed.</td>
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<td>K</td>
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<td>Polygon K is a newly digitised polygon, created to ensure that sample point 17 of Moorkens &amp; Killeen (2011) falls within a polygon. It was not visited in the current study, and so a small indicative polygon was created, encircling the sample point. As this consists of Class I vegetation and has a wetness level of 4 (from Moorkens &amp; Killeen, 2011), this small polygon is likely to be Optimal-Suboptimal at least.</td>
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Monitoring Period: 2007-2012

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<th>Polygon</th>
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<tr>
<td>A</td>
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<td>Polygon A - Sub-optimal habitat – open fen and swamp at Portumna Adam.</td>
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<td>0.255</td>
<td>Polygon B - small area of swamp in the forest</td>
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<td>Polygon C - fen bordering the forest</td>
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Transect samples

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<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
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<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
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Vertigo moulinsiana monitoring at Portumna

## Spot Samples

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<th>Sample</th>
<th>Grid ref.</th>
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<td>4</td>
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</table>
5. CONDITION ASSESSMENT

5.1 Population Assessment: 3 passes Favourable (green); 1-2 pass Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in at least nine samples (or 75% from a minimum of 12 samples) on the transect</td>
<td>Present in 13 samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in at least nine samples (or 75% from a minimum of 12 samples) from three other locations in Portumna Forest Park (potentially including Polygons B, C, F, G, H and I, but not necessarily limited to these areas)</td>
<td>Present in 8 out of 10 samples (80%)</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in at least 9 samples (or 75% from a minimum of 12 samples) from 3 locations at the edge of the Forest Park (= sites 12-15)</td>
<td>Present in 13 out of 13 samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in one other location around the northern shores of Lough Derg (may include Polygons D, E, J or K but not necessarily limited to these)</td>
<td>Present in 1 other location</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in at least 10 samples (or 75% from a minimum of 15 samples) with a geographical spread near Portumna marina (= sites 2-10)</td>
<td>Present in 19 out of 28 samples</td>
<td>Pass</td>
</tr>
</tbody>
</table>

In the monitoring period 2007-2012, Vertigo moulinsiana was present in 19 out of 28 samples in Polygon A (adjacent to the marina at Portumna) and 11 out of 11 samples in Polygons B and C (in Portumna Forest Park). In the current monitoring period (2013-2018), adult Vertigo moulinsiana were found in 10 out of 12 samples in Polygon A and three out of four samples in Polygons B and C. Long & Brophy (2013) set up a monitoring transect in Polygon A, which was re-surveyed in the during the current survey.

Moorkens & Killeen (2011) had positive samples (but no polygons digitised) in three other locations within Portumna Forest Park. In the current survey, we revisited some of these areas, as well as adding new locations. There were positive samples in all areas.

Long & Brophy (2013) extended the known distribution of Vertigo moulinsiana at Lough Derg, recording the species at...
Vertigo moulinisiana monitoring at Portumna

2013-2018 Kilgarven Quay/Brockagh, approximately 17km south of Portumna, and on the eastern bank of the Shannon just downstream of Portumna Bridge. The current survey re-recorded the species from Kilgarven Quay, but not from the site at Portumna Bridge.

Based on the criteria of Moorkens & Killeen (2011), with additions to take account of the new survey areas added by Long & Brophy (2013), the Population Assessment for Portumna is Favourable (green).

2007-2012 the snail is scattered in its distribution and is locally frequent

5.2 Habitat Assessment: 3-4 passes Favourable (green); 1-2 passes Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>Over 80% of the samples on the Transect in Polygon A are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5</td>
<td>85% dominated by suitable vegetation and 100% fall within soil moisture classes 3-5</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>0</td>
<td>N/A</td>
<td>NO TRANSECT RECORDED</td>
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<td></td>
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</tbody>
</table>

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>At least 2.5ha of habitat within polygon areas A-C sub-optimal with optimal areas</td>
<td>2.8ha Optimal-Suboptimal or better</td>
<td>Pass</td>
</tr>
<tr>
<td>2013-2018</td>
<td>Habitat extent1</td>
<td>At least 3ha of habitat within Polygons D, E, J and K classed as Suboptimal or better</td>
<td>4ha Suboptimal or better</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat extent</td>
<td>At least 2.5ha of habitat within polygon areas A-C sub-optimal with optimal areas</td>
<td>2.79 ha</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat quality</td>
<td>Over 80% of the samples at sites near Portumna marina (sites 2-10) are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5</td>
<td>100% of samples</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Habitat quality</td>
<td>Over 80% of the samples at sites in the Forest Park (sites 12-15) are dominated by suitable vegetation (Classes I &amp; II) and fall within soil moisture classes 3-5</td>
<td>100% of samples</td>
<td>Pass</td>
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</tbody>
</table>

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
</table>

5.3.1 Monitoring Transect

Following the monitoring period 2007-2012, the known area of habitat at Portumna suitable for supporting Vertigo moulinisiana was encompassed by three polygons: Polygon A at Portumna Marina, at two polygons in Portumna Forest Park (B & C). Polygon A was classed as Suboptimal, while both polygons B and C were classed as Optimal-Suboptimal in 2007-2012. In the current monitoring period, Polygon A was upgraded to Optimal, while polygons B and C remained Optimal-Suboptimal. The upgrading of Polygon A was due to interpretation rather than any ecological change, as abundant habitat with suitable vegetation and wetness was present in the polygon, with no indication that change had occurred. A monitoring transect was set up by Long & Brophy (2013) in Polygon A.

Long & Brophy (2013) added additional polygons around Lough Derg that supported habitat that could support Vertigo moulinisiana. Based on the criteria of Moorkens & Killeen (2011), with some additions to take account of the new polygons, the Habitat Assessment for Portumna is Favourable (green).

2007-2012 Much of the habitat at the site appears to be in good condition for V. moulinisiana.
A number of factors are affecting Vertigo moulinsiana habitat at Portumna. In places there is cattle, sheep, horse and deer grazing. However, the main threats of concern are succession in small areas of suitable habitat in Portumna Forest Park, where trees and scrub are encroaching on Vertigo moulinsiana habitat, and flooding, which could affect most of the suitable habitat around the site were the hydrological regime at the site to change (either due to man’s activities, or due to climate change). In the longer term, the proposed extraction of water from Lough Derg to supply the Greater Dublin Area, is something which has the potential to affect the Vertigo moulinsiana habitat and should be closely monitored. However, this is not yet occurring, and so it not factored in our assessment here. Given the current status of the site, and factoring in the impacts noted as well as their scale, the Future Prospects for Portumna are considered to be Favourable (green).

As the impacts are low, Future prospects have been assessed as Favourable

Due to the Favourable (green) results for Population Assessment, Habitat Assessment and Future Prospects, the Overall Assessment for Portumna is Favourable (green ).

**5.4 Overall Assessment**

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
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</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

**Mon. period**

**Overall Notes**

2013-2018 Due to the Favourable (green) results for Population Assessment, Habitat Assessment and Future Prospects, the Overall Assessment for Portumna is Favourable (green ).

2007-2012
Vertigo moulinsiana monitoring at Portumna

2013-2018

**Area of occupancy:** The habitat that supports Vertigo moulinsiana within this site is mostly the fringe swamp habitat at the edge of Lough Derg. Access is mostly from the trails in the Forest Park. Other locations around Lough Derg that support the species were identified by Long & Brophy (2013).

**Discussion:**
The habitats of the northern areas of lakeshore of Lough Derg, and its hinterland, supports abundant suitable habitat for Vertigo moulinsiana in the form of fens and reedbeds, including areas forming a mosaic with the woodland habitats of Portumna Forest Park. The species continues to be widely present within the original area surveyed by Moorkens & Killeen (2011), and has also been found further south on the eastern shores of Lough Derg by Long & Brophy (2013) and again in the current survey. Further exploratory surveys would be likely to extend the range still further, on both the east and west shores of the lake - though much of the habitat is difficult to access (often consisting of floating vegetation, and/or deep standing water, or located beyond impassable drains/channels). While the water levels of Lough Derg are regulated by the ESB at Parteen Weir, balancing various social, economic and ecological pressures, flooding can be an issue on the lake and this may impact on the Vertigo moulinsiana habitat. In the longer term, the proposed extraction of water from Lough Derg to supply the Greater Dublin Area, is something which has the potential to affect the Vertigo moulinsiana habitat and should be closely monitored. Overall, this is a very important site for this species given its scale and the scope for further expansion of the known range of the species there.

**Monitoring recommendations:**
The Portumna Vertigo moulinsiana site is currently in favourable condition, with few imminent threats identified. However, the development of Lough Derg as a water supply for the Greater Dublin Area poses a long-term threat to the species, which will depend on the effects of the project on lake water levels and flooding regime. For this reason, along with the fact that additional areas have been found that support the species around the lake, regular monitoring is required to track any change and to extend knowledge about the site. Monitoring should follow that of Moorkens & Killeen (2011) with some significant changes based on the new polygons and enhanced information on the species at the site:

- Repeat Transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 12 samples from six separate samples locations along transect.
- Take samples from at least 3 other locations (minimum 12 samples) with optimal habitat in the Forest Park (potentially including Polygons B, C, F, G, H and I, but not necessarily limited to these areas), record information as above.
- Take samples from at least 3 other locations (minimum 12 samples) with optimal habitat around the northern shores of Lough Derg (may include Polygons D, E, J or K, but not necessarily limited to these), record information as above. (Consider prioritising Polygon K for a re-visit, and if so, pay particular attention to the extent of potentially suitable habitat and re-map - see notes on this polygon above.)
- Continue to investigate new habitat areas for the target species around the shores of Lough Derg, and in particular, endeavour to sample beyond the known extent of the distribution of the target species at the site.
- Re-determine boundary of the habitat polygons and assign habitat to Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

**Management recommendations:**
It is recommended that no changes are made with regard to the current management of the site. The site currently comprises an extensive largely semi-natural system, with grazing by sheep, cattle and horses limited to certain areas. The hydrological regime of the Vertigo moulinsiana sites is tied in with the levels of Lough Derg, and so there should be no significant changes made to the pattern of water levels within and across years. This will be more important than ever should water abstraction for the Greater Dublin Area come to pass.
Area of occupancy: The habitat that supports Vertigo moulinsiana within this site is mostly the fringe swamp habitat at the edge of Lough Derg. Access is mostly from the trails in the Forest Park.

Discussion:
The Condition of the site and the feature based upon the 2010 survey has been assessed as Favourable.

This survey has shown that Vertigo moulinsiana is much more widely spread along the northern end of Lough Derg than was previously known, with a new site located some 7km to the south-west of Portumna. Much of the marginal habitat is very difficult to access and, therefore, it is likely that V. moulinsiana occurs much more widely within this area. Most of the habitat lies well away from the shoreline of the lough where a dense fen with a more stable hydrology has developed. In zones nearer the lough, the habitat is especially susceptible to inundation and the habitat is less stable.

The Vertigo moulinsiana habitat is maintained by its high groundwater table and by inundation of the lough water at wet times of year. The lack of grazing has led to a build up of deep litter which rises above the inundation at times of year when the snails are at litter level. During active periods, the snails are in humid conditions high on the stems of the swamp vegetation. The site would be vulnerable to long term hydrological changes and potential effects of climate change.

This is an important site for the species as it is significant in terms of national Range but also the area of occupancy appears to be relatively large. As only a fraction of the area which supports potentially suitable V. moulinsiana habitat has been surveyed, it is recommended a more wide-ranging survey is carried out to determine the full distribution and abundance of the snail.

Monitoring recommendations:
Although the Condition of the site, both in terms of habitat and Vertigo moulinsiana distribution and abundance has been assessed as Favourable, it is recommended that monitoring is carried out at a minimum of 3 yearly intervals. This should be re-assessed after a more detailed survey has been carried out and also in light of any deterioration of Condition or any changes to site management:

- Take at least 3 samples at each from at least 5 locations with optimal habitat near Portumna marina (e.g. sites 2-10 from the 2010 survey), in field record: vegetation height, vegetation composition, ground moisture class, numbers of V. moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Take at least 4 samples at each from at least 3 locations with optimal habitat at the edge of the Forest Park (e.g. sites 12-15 from the 2010 survey), record information as above
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal & Sub-optimal, Sub-optimal, Sub-optimal and Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for V. moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
Existing Management

Most of the habitat within the site is unmanaged. The area at Bonaveen is subject to some horse grazing which could become a problem if its intensity was increased.

Proposed management prescription for site

No change is recommended from the existing management.
**Site report - Vertigo Monitoring**

Vertigo mouliniana monitoring at Royal Canal, Longford Branch

1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM21  County: Longford

SAC Site Code: n/a  Not in SAC

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>12-14 October 2015</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

(Habitat description written as part of 2014-17 survey) The general habitat in which Vertigo mouliniana is present is low lying old canal bed with swamp/fen and some spring flushing. The snail is found typically on Glyceria maxima in association with Phalaris arundinacea, and Iris pseudacorus and a number of other tall-growing species, mainly sedges. The vegetation present has affinities with NVC communities S5 Glyceria maxima swamp, S9 Carex rostrata swamp (S9b Menyanthes trifoliata-Equisetum fluviatile sub-community) and S14 Sparganium erectum swamp (Rodwell, 1995). The water table was above ground surface level in places. There are no EU habitats that correspond to this habitat, and it falls within the more general habitat of rich fen and flush (PF1), freshwater marsh (GM1), reed and large sedge swamps (FS1) and tall herb swamps (FS2) of Fossitt (2000).

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Tall Carex species, Glyceria maxima, Sparganium erectum, Typha latifolia

Class II: Phragmites australis, Carex rostrata, Equisetum fluviatile, Equisetum variegatum

Class III: Menyanthes trifoliata, Berula erecta, Mentha aquatica, Carex disticha

Class IV: All other species

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

The habitat for Vertigo mouliniana is in the canal bed of the disused Longford Branch of the Royal Canal. The canal bed supports extensive areas of suitable vegetation (including Sparganium erectum, Glyceria maxima and tall Carex species) and wetness, though shading and scrubbing over is occurring where Salix cinerea subsp. oleifolia and Alnus glutinosa have become established. The site supports a good population of Vertigo mouliniana along its length and sensitive management is required to maintain the habitat in favourable condition though scrub control and clearance. Hydrological monitoring is also recommended in order to understand if the habitat is drying out, or if there is enough water seepage to maintain current wetness levels.

3. TRANSECT DETAILS

<table>
<thead>
<tr>
<th>TRANSECT</th>
<th>1</th>
<th>MONITORING PERIOD:</th>
<th>2013-2018</th>
</tr>
</thead>
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<td>Start point:</td>
<td>N 11538 72629</td>
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<td></td>
</tr>
<tr>
<td>End point:</td>
<td>N 11530 27245</td>
<td>Middle of canal bed</td>
<td></td>
</tr>
<tr>
<td>Transect length:</td>
<td>120</td>
<td>Direction: S-N</td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>Middle of canal bed, with Glyceria maxima, Sparganium erectum and Berula erecta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling frequency:</td>
<td>Ten samples were taken at 10-20m intervals</td>
<td></td>
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</tr>
</tbody>
</table>

4. RESULTS

Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Monitoring Period:</th>
<th>2013-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polygon</td>
<td>Habitat Type</td>
</tr>
<tr>
<td>A</td>
<td>Optimal-Suboptimal</td>
</tr>
</tbody>
</table>
### Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>1</td>
<td>0m</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>2</td>
<td>10m</td>
<td>19</td>
<td>11</td>
<td>30</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>3</td>
<td>20m</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>4</td>
<td>30m</td>
<td>5</td>
<td>12</td>
<td>17</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>5</td>
<td>40m</td>
<td>5</td>
<td>4</td>
<td>9</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>6</td>
<td>50m</td>
<td>10</td>
<td>6</td>
<td>16</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>7</td>
<td>60m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>8</td>
<td>70m</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>9</td>
<td>90m</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>10</td>
<td>110m</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
</tbody>
</table>

### Spot Samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>01a</td>
<td>N 09680 69569</td>
<td>1</td>
<td>9</td>
<td>10</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>01b</td>
<td>N 09680 69569</td>
<td>1</td>
<td>8</td>
<td>9</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>01c</td>
<td>N 09680 69569</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>02a</td>
<td>N 09743 69575</td>
<td>2</td>
<td>8</td>
<td>10</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>02b</td>
<td>N 09743 69575</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>02c</td>
<td>N 09743 69575</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>03a</td>
<td>N 09934 69973</td>
<td>6</td>
<td>10</td>
<td>16</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>03b</td>
<td>N 09934 69973</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>03c</td>
<td>N 09934 69973</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>04a</td>
<td>N 10177 70118</td>
<td>16</td>
<td>70</td>
<td>86</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>04b</td>
<td>N 10177 70118</td>
<td>8</td>
<td>100</td>
<td>108</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>05a</td>
<td>N 10643 70563</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>5</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>05b</td>
<td>N 10643 70563</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>5</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>06a</td>
<td>N 10787 70839</td>
<td>100</td>
<td>110</td>
<td>210</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>06b</td>
<td>N 10787 70839</td>
<td>64</td>
<td>40</td>
<td>104</td>
<td>I</td>
<td>4</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>07a</td>
<td>N 11074 71151</td>
<td>2</td>
<td>42</td>
<td>44</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>07b</td>
<td>N 11074 71151</td>
<td>3</td>
<td>80</td>
<td>83</td>
<td>I</td>
<td>5</td>
<td>Optimal</td>
</tr>
</tbody>
</table>
5. CONDITION ASSESSMENT

5.1 Population Assessment: 2 passes Favourable (green); 1 pass Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Presence/Absence</td>
<td>At least five positive samples (with adult or sub-adult snails) from a minimum of ten samples taken from along the transect</td>
<td>Eight positive samples</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2 Habitat Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>Over 50% of the samples along the transect are dominated by suitable vegetation (Classes I &amp; II)</td>
<td>100% of samples are dominated by suitable vegetation (Class I)</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Habitat extent</td>
<td>At least three of the four polygons classed as Optimal-Suboptimal or better</td>
<td>Two polygons Optimal, one polygon Optimal-Suboptimal</td>
<td>Pass</td>
</tr>
</tbody>
</table>

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>K02.01</td>
<td>species composition change (succession)</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>25%</td>
<td>Shading by trees along bank (Salix cinerea subsp. oleifolia &amp; Alnus glutinosa) shading out wetland vegetation in places. At least 35% additional area at risk in near future.</td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Royal Canal, Longford Branch

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

Mon. period

<table>
<thead>
<tr>
<th>Overall Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
</tr>
</tbody>
</table>
| The population and habitat assessments returned results of Favourable (green), as did the Future Prospects, resulting in an Overall Assessment of Favourable (green).

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy: The site is the canal bed of the disused Longford Branch of the Royal Canal, beginning close to its junction with the Royal Canal Main Line. Access is via the towpath from where the N63 Longford - Lanesborough Road crosses the Royal Canal Main Line.

Discussion:
The habitat for Vertigo moulinsiana is in the canal bed of the disused Longford Branch of the Royal Canal. The canal bed supports extensive areas of suitable vegetation (including Sparganium erectum, Glyceria maxima and tall Carex species) and wetness, though shading and scrubbing over is occurring where Salix cinerea subsp. oleifolia and Alnus glutinosa have become established. The site supports a good population of Vertigo moulinsiana along its length and sensitive management is required to maintain the habitat is favourable condition though scrub control and clearance. Hydrological monitoring is also recommended in order to understand if the habitat is drying out, or if there is enough water seepage to maintain current wetness levels.

Monitoring recommendations:
It is recommended that monitoring is carried out at a minimum of three-yearly intervals at this site as it is of high conservation importance. This should be re-assessed in light of any deterioration of condition or any changes to site management. The monitoring should be carried out as follows:

- Repeat Transect 1, recording vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 10 samples
- Take at least 10 samples spread across the remaining habitat polygons recording vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs
- Re-determine boundary of the habitat polygons and assign habitat to either Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
It is recommended that scrub/tree control measures be implemented in places along the site. The focus should be on areas where good Vertigo moulinsiana habitat is being shaded by trees growing on the canal bed or banks, or will be if action is not taken. These areas should be prioritised above densely shaded areas which have already lost suitable vegetation under deep shade. All scrub control should be carried out in an environmentally sensitive manner which minimises impacts on this sensitive habitat. For example, cuttings should be removed from the site; trampling or damage of the canal bed habitat should be avoided.

In addition to scrub/tree control, hydrological monitoring should be instigated to understand if the canal bed is drying out, or if there is adequate water seepage to maintain current wetness levels. Should the habitat be found to be drying out, immediate measures will be needed to halt this.

Succession was identified as a potential threat to the future survival of Vertigo moulinsiana across 25% of the site due to the shading caused by species such as Salix cinerea subsp. oleifolia and Alnus glutinosa, with an additional 35% at risk in the near future. There are currently, however, still long stretches which are in good condition, and based on this, the Future Prospects for the Royal Canal (Longford Branch) are assessed as Favourable (green).
Vertigo moulinsiana monitoring at Fiagh Bog

1. SITE CODE AND LOCATION DETAILS

1.1 Site code and location

Vertigo Site Code: VmCAM22  County: Tipperary

SAC Site Code: n/a  Not in SAC

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>8 August 2016</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):

1.3 Definition of Vegetation Classes (from baseline survey):

Class I: Not in SAC

Class II: Not in SAC

Class III: Not in SAC

Class IV: Not in SAC

1.4 Definition of Soil Moisture Classes (from baseline survey):

1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:

This site was included in the current monitoring round due to a record of Vertigo moulinsiana from the road margin in 1970. Moorkens recorded a dead Vertigo moulinsiana shell in 1995, but no live snails. The site has undergone extensive drainage and reclamation for agricultural land over the last number of years, particularly in the vicinity of the 1970 record, and this work is on-going. In terms of possible habitat, extensive stands of Sparganium erectum were recorded in a stream to the west of Fiagh Bog in the current survey. The stream had a water depth of over 50cm and steep banks, so had limited ability to support the target species. Sparse stands of Phragmites australis were recorded from drains towards the east end of the bog (and the area of active reclamation), but these are likely to represent recent growth following the excavation of the drains. The site no longer appears to have any population of Vertigo moulinsiana, does not support any area of potentially suitable habitat, and future surveys are not recommended.

3. TRANSECT DETAILS

TRANSECT: 0  MONITORING PERIOD: 2013-2018

Start point: NO TRANSECT RECORDED

End point:

Transect length:

Direction:

Description:

Sampling frequency:

4. RESULTS

Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Monitoring Period: 2013-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polygon</td>
</tr>
<tr>
<td>Unsuitable</td>
</tr>
</tbody>
</table>

Transect samples

Spot Samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring period 2013-2018 (4 samples)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>01</td>
<td>R 93423 96890</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Suboptimal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>02</td>
<td>R 93527 96777</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Suboptimal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2018</td>
<td>03</td>
<td>R 93774 96751</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Suboptimal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Fiagh Bog

5. CONDITION ASSESSMENT

5.1 Population Assessment:

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>0</td>
<td>N/A</td>
<td></td>
<td>NO TRANSECT RECORDED</td>
<td></td>
</tr>
</tbody>
</table>

Population Notes:

2013-2018 No live Vertigo moulinsiana have been found at this site since 1970, with one dead shell found by Moorkens in 1995. No positive samples for Vertigo moulinsiana were found at the site in the course of the current survey. The Population Assessment must therefore be Unfavourable Bad (red).

5.2 Habitat Assessment:

5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>0</td>
<td>N/A</td>
<td></td>
<td>NO TRANSECT RECORDED</td>
<td></td>
</tr>
</tbody>
</table>

Habitat Notes:

2013-2018 There are no defined habitat polygons for the site, with the last live record of Vertigo moulinsiana being from the road margin. Limited areas of tall reed and sedge vegetation were recorded in drains and streams, but large areas of the site, including the 100m square where the snail was previously found, has been subject to drainage, levelling and reseeding. Even within the drains, which hold the last possibility for potentially suitable habitat, they are too steep-sided to be suitable - with water too deep at the bottom, and sides too dry. The Habitat Assessment for Fiagh Bog is Unfavourable Bad (red).

5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Habitat Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>There are no defined habitat polygons for the site, with the last live record of Vertigo moulinsiana being from the road margin. Limited areas of tall reed and sedge vegetation were recorded in drains and streams, but large areas of the site, including the 100m square where the snail was previously found, has been subject to drainage, levelling and reseeding. Even within the drains, which hold the last possibility for potentially suitable habitat, they are too steep-sided to be suitable - with water too deep at the bottom, and sides too dry. The Habitat Assessment for Fiagh Bog is Unfavourable Bad (red).</td>
</tr>
</tbody>
</table>

5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>J02.01</td>
<td>Landfill, land reclamation and drying out, general</td>
<td>Inside</td>
<td>High</td>
<td>Negative</td>
<td>20%</td>
<td>Land drained, levelled and reseeded</td>
</tr>
</tbody>
</table>

Future Prospects Notes:

2013-2018 Vertigo moulinsiana has not been recorded alive at this site since 1970. Based on this, the lack of suitable habitat, and the on-going reclamation of land for cattle grazing, the Future Prospects for the site are considered to be Unfavourable Bad (red).

5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
</tr>
</tbody>
</table>

Overall Notes:

2013-2018 Considering the results for the Population and Habitat Assessments, and the Future Prospects, the Overall Assessment for Fiagh Bog is Unfavourable Bad (red).

6. DISCUSSION

Monitoring period

2013-2018

Area of occupancy:

Discussion:

This site was included in the current monitoring round due to a record of Vertigo moulinsiana from the road margin in 1970. Moorkens recorded a dead Vertigo moulinsiana shell in 1995, but no live snails. The site has undergone extensive drainage and reclamation for agricultural land over the last number of years, particularly in the vicinity of the 1970 record, and this work is on-going. In terms of possible habitat, extensive stands of Sparganium erectum were recorded in a stream to the west of Fiagh Bog in the current survey.
The stream had a water depth of over 50cm and steep banks, so had limited ability to support the target species. Sparse stands of Phragmites australis were recorded from drains towards the east end of the bog (and the area of active reclamation), but these are likely to represent recent growth following the excavation of the drains. The site no longer appears to have any population of Vertigo moulinsiana, does not support any area of potentially suitable habitat, and future surveys are not recommended.

**Monitoring recommendations:**
Given the time that has passed since the last live record at this site, and the continued reclamation of land for agriculture, it is not considered a good use of resources to carry out monitoring at this site into the future.

**Management recommendations:**
Given the extensive and long-running land-reclamation and drainage which has occurred (and is still occurring) at this site, it is extremely damaged. With the possible exception of a large-scale programme of drain-blocking and re-wetting, it is unlikely that any management actions would result in a return of the site to conditions that would provide suitable habitat for Vertigo moulinsiana. Thus from the point of view of the occurrence of Vertigo moulinsiana at the site at least, there are no management recommendations.
Vertigo moulinsiana monitoring at Castletown

1. SITE CODE AND LOCATION DETAILS
1.1 Site code and location

Vertigo Site Code: VmCAM23  County: Waterford
SAC Site Code: n/a  Not in SAC

Location description (from baseline survey):

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Date surveyed</th>
<th>Recorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1-2 November 2016</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
<tr>
<td>2007-2012</td>
<td>15 October &amp; 20 November 2012</td>
<td>John Brophy &amp; Maria Long</td>
</tr>
</tbody>
</table>

1.2 General Habitat Description (from baseline survey):
There are three parcels of wetland, mainly swamp and reedbed, and some wet grassland. Much of the vegetation conforms to 'reed and large sedge swamp' (FS1) of Fossitt (2000), with some areas being classified as wet grassland (GS4). The most commonly recorded NVC vegetation category present was S14 (Sparganium erectum swamp), with S4 (Phragmites australis swamp and reed-beds), MG10 (Holcus lanatus-Juncus effuses rushpasture) and MG13 (Aegrotesstolonifera-Alopecurus geniculatus grassland) all also present.

1.3 Definition of Vegetation Classes (from baseline survey):
Class I: Not in SAC
Class II:
Class III:
Class IV:

1.4 Definition of Soil Moisture Classes (from baseline survey):
1: Dry. No visible moisture on ground surface.
2: Damp. Ground visibly damp, but water does not rise under pressure.
3: Wet. Water rises under light pressure.
4: Very wet. Pools of standing water, generally less than 5cm deep.
5: Site under water. Entire sampling site in standing or flowing water over 5cm deep.

2. SUMMARY:
Castletown was first surveyed specifically for Vertigo moulinsiana in 2012 by Long & Brophy. Castletown is unusual among Vertigo moulinsiana sites for a few reasons. It is one of two recently discovered sites in Co. Waterford, and so is an outlier in terms of the species’ known distribution in Ireland. It is a small, isolated wetland, and has no conservation designation. The vegetation in Polygon A, the biggest area supporting the species at the site, is very grassy (it was unusually grassy even in 2012, but had become more so in 2016). This vegetation is atypical for Vertigo moulinsiana, the species being more usually associated with tall-growing sedges and reeds. The site was also quite dry underfoot throughout polygons A and B in 2016. And yet the species was found to be common, widespread and abundant throughout polygons A and C in both years. Based on a broader understanding of both the wetness and vegetation conditions thought to be necessary to support populations of Vertigo moulinsiana, this site has dropped in status from Favourable (green) to Unfavourable Bad (red). However, given that the species is present in high quantities throughout, this result may need to be interpreted with some caution. Repeat monitoring within two years is a priority at this site to assess if observed changes in habitat will begin to be reflected in decreasing snail numbers, or if indeed the species is surviving well in the apparently less than ideal conditions. Liaison with landowners is needed immediately to ensure no further drainage occurs. Some partial drain blocking may be necessary to slow the flow of water from this site. Liaison with Waterford County Council, Coillte and/or The Forest Service is also needed to ensure no inappropriate development or planting occurs at this site. Consideration should also be given to the fact that nutrient run-off from adjacent forestry or agricultural land may also be a contributory factor in the dense growth of Holcus lanatus seen in Polygon A in particular.

3. TRANSECT DETAILS

TRANSECT: 1  MONITORING PERIOD: 2013-2018
Start point: S 61907 05122
End point: S 62023 05128
Transect length: 120  Direction: W-E
Description: Sampling frequency: Approximately every 10m

4. RESULTS
Polygon habitat characteristics

<table>
<thead>
<tr>
<th>Monitoring Period: 2013-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polygon</td>
</tr>
<tr>
<td>A</td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Castletown

### Transect samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Sample</th>
<th>Location</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>1</td>
<td>01a; 0m</td>
<td>7</td>
<td>20</td>
<td>27</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>2</td>
<td>01b; 0m</td>
<td>3</td>
<td>21</td>
<td>24</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>3</td>
<td>02a; 15m</td>
<td>19</td>
<td>41</td>
<td>60</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
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<td>2013-2018</td>
<td>1</td>
<td>4</td>
<td>02b; 15m</td>
<td>13</td>
<td>48</td>
<td>61</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>5</td>
<td>03a; 30m</td>
<td>9</td>
<td>18</td>
<td>27</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>6</td>
<td>03b; 30m</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>7</td>
<td>04a; 45m</td>
<td>33</td>
<td>96</td>
<td>129</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>8</td>
<td>04b; 45m</td>
<td>43</td>
<td>39</td>
<td>82</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal</td>
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<tr>
<td>2013-2018</td>
<td>1</td>
<td>9</td>
<td>05a; 75m</td>
<td>83</td>
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<td>297</td>
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<td>05b; 75m</td>
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<tr>
<td>2013-2018</td>
<td>1</td>
<td>11</td>
<td>06a; 85m</td>
<td>28</td>
<td>132</td>
<td>160</td>
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<td>2</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>12</td>
<td>06b; 85m</td>
<td>44</td>
<td>139</td>
<td>183</td>
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<tr>
<td>2013-2018</td>
<td>1</td>
<td>13</td>
<td>07a; 105m</td>
<td>7</td>
<td>24</td>
<td>31</td>
<td>II</td>
<td>2</td>
<td>Suboptimal-Unsuitable</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>14</td>
<td>07b; 105m</td>
<td>10</td>
<td>27</td>
<td>37</td>
<td>IV</td>
<td>2</td>
<td>Suboptimal-Unsuitable</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>15</td>
<td>08a; 120m</td>
<td>8</td>
<td>53</td>
<td>61</td>
<td>IV</td>
<td>3</td>
<td>Suboptimal-Unsuitable</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>16</td>
<td>08b; 120m</td>
<td>16</td>
<td>100</td>
<td>116</td>
<td>IV</td>
<td>3</td>
<td>Suboptimal-Unsuitable</td>
</tr>
</tbody>
</table>

### Spot Samples

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Sample</th>
<th>Grid ref.</th>
<th>Adults</th>
<th>Juveniles</th>
<th>Total</th>
<th>Veg. class</th>
<th>Wetness</th>
<th>Habitat suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>01a</td>
<td>S 61954 04871</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>01b</td>
<td>S 61954 04871</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>2</td>
<td>Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>02a</td>
<td>S 61927 04818</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>02b</td>
<td>S 61927 04818</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>03a</td>
<td>S 61960 04738</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>03b</td>
<td>S 61960 04738</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>04a</td>
<td>S 62004 04650</td>
<td>0</td>
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<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>04b</td>
<td>S 62004 04650</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
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<td>2013-2018</td>
<td>05a</td>
<td>S 62092 04694</td>
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<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
<td>05b</td>
<td>S 62092 04694</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>3</td>
<td>Optimal-Suboptimal</td>
</tr>
<tr>
<td>2013-2018</td>
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<td>S 62128 04805</td>
<td>53</td>
<td>363</td>
<td>416</td>
<td>I</td>
<td>5</td>
<td>Optimal-Suboptimal</td>
</tr>
</tbody>
</table>
## 5. CONDITION ASSESSMENT

### 5.1 Population Assessment: 2 passes Favourable (green); 1 pass Unfavourable Inadequate (amber); 0 passes Unfavourable Bad (red)

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in samples on the transect, with a minimum of 4 positive samples out of 8</td>
<td>Samples at all 8 sample locations positive</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Presence/Absence</td>
<td>Adult or sub-adult snails are present in samples on the transect, with a minimum of 4 positive samples out of 8</td>
<td>All 8 samples positive</td>
<td>Pass</td>
</tr>
</tbody>
</table>

### 5.2 Habitat Assessment: 3 passes Favourable (green); 2 passes Unfavourable Inadequate (amber); 0-1 passes Unfavourable Bad (red)

#### 5.2.1 Transect level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Transect</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat extent</td>
<td>At least one habitat zone on the transect is classed as Optimal-Suboptimal or better AND 60m of habitat along the transect is classed as Suboptimal or better</td>
<td>No Optimal-Suboptimal habitat present AND 88m Suboptimal habitat</td>
<td>Fail</td>
</tr>
<tr>
<td>2013-2018</td>
<td>1</td>
<td>Habitat quality</td>
<td>Soils, at time of sampling, are saturated (Optimal wetness) for 60m along the transect</td>
<td>88m of transect too dry</td>
<td>Fail</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat extent</td>
<td>At least one habitat zone on the transect is classed as Optimal-Suboptimal or better AND 60m of habitat along the transect is classed as Suboptimal or better</td>
<td>Optimal-Suboptimal habitat present AND 88m Suboptimal or better</td>
<td>Pass</td>
</tr>
<tr>
<td>2007-2012</td>
<td>1</td>
<td>Habitat quality</td>
<td>Soils, at time of sampling, are saturated (Optimal wetness) for 60m along the transect</td>
<td>Entire transect (88m) of Optimal wetness</td>
<td>Pass</td>
</tr>
</tbody>
</table>

#### 5.2.2 Site level

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Indicator</th>
<th>Target</th>
<th>Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Vertigo moulinsiana monitoring at Castletown

### 5.3 Future Prospects Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Activity code</th>
<th>Activity description</th>
<th>Location</th>
<th>Intensity</th>
<th>Influence</th>
<th>Area affected</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>A04.03</td>
<td>Abandonment of pastoral systems, lack of grazing</td>
<td>Inside</td>
<td>Medium</td>
<td>Negative</td>
<td>50%</td>
<td>Very dense mats of Holcus lanatus in Polygon A likely to impede growth of tall vegetation suitable for Vertigo moulinsiana</td>
</tr>
<tr>
<td>2013-2018</td>
<td>J02.01</td>
<td>Landfill, land reclamation and drying out, general</td>
<td>Outside</td>
<td>High</td>
<td>Negative</td>
<td>60%</td>
<td>Very large drains cleared along north and west boundaries. Road drain cleared since previous survey.</td>
</tr>
</tbody>
</table>

### 5.4 Overall Assessment

<table>
<thead>
<tr>
<th>Mon. period</th>
<th>Population assessment</th>
<th>Area of suitable habitat</th>
<th>Future prospects</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2018</td>
<td>Green</td>
<td>Red</td>
<td>Amber</td>
<td>Red</td>
</tr>
<tr>
<td>2007-2012</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

### Overall Notes

2013-2018 The autumn of 2016 was an exceptionally dry one, but the clearance of a very large drain running along polygons A and B is also likely to be a contributory factor in the drying of the habitat which was evident. These changes in wetness have had a big impact on the potential suitability for Vertigo moulinsiana and so there has been a drop from Favourable (green) to Unfavourable Bad (red) in the Habitat Assessment. This means that the Overall Assessment also drops from Favourable (green) to Unfavourable Bad (red).

2007-2012

### 6. DISCUSSION

**Monitoring period**

2013-2018

**Area of occupancy:** Castletown is a small site located just west of Waterford Airport, and approximately 3km north-east of Tramore. It consists of three parcels of wetland supporting Vertigo moulinsiana, mainly swamp and reed-bed,
Vertigo moulinsiana monitoring at Castletown

with some wet grassland on either side of the road at S614044.

Discussion:
Castletown was first surveyed specifically for Vertigo moulinsiana in 2012 by Long & Brophy (2013). Castletown is unusual among Vertigo moulinsiana sites for a few reasons. It is one of two recently discovered sites in Co. Waterford, and so is an outlier in terms of the species’ known distribution in Ireland. It is a small, isolated wetland, and has no conservation designation. The vegetation in Polygon A, the biggest area supporting the species at the site, is very grassy (it was unusually grassy even in 2012, but had become more so in 2016). This vegetation is atypical for Vertigo moulinsiana, the species being more usually associated with tall-growing sedges and reeds. The site was also quite dry underfoot throughout polygons A and B in 2016. And yet the species was found to be common, widespread and abundant throughout polygons A and C in both years, and in small pockets in Polygon B. Based on a broader understanding of both the wetness and vegetation conditions thought to be necessary to support populations of Vertigo moulinsiana, this site has dropped in status from Favourable (green) to Unfavourable Bad (red). However, given that the species is present in high quantities throughout, this result may need to be interpreted with some caution. Repeat monitoring within two years is a priority at this site to assess if observed changes in habitat will begin to be reflected in decreasing snail numbers, or if indeed the species is surviving well in the apparently less than ideal conditions. Liaison with landowners is needed immediately to ensure no further drainage occurs. Some partial drain blocking may be necessary to slow the flow of water from this site. Liaison with Waterford County Council, Coillte and/or The Forest Service is also needed to ensure no inappropriate development or planting occurs at this site. Consideration should also be given to the fact that nutrient run-off from adjacent forestry or agricultural land may also be a contributory factor in the dense growth of Holcus lanatus seen in Polygon A in particular.

Monitoring recommendations:
As a priority, this site should be monitored again in two years’ time, i.e. in 2018, due to the observed drying out which is potentially due to increased drainage.
- Repeat Transect 1, in field record: vegetation height, vegetation composition, ground moisture class, numbers of Vertigo moulinsiana (adult & juvenile) and other molluscs, minimum 16 samples from eight separate samples locations along transect.
- Take samples from at least 3 other locations in Polygon A, record information as above.
- Take samples from at least 3 locations in each of Polygons B and C, record information as above.
- Re-determine boundary of the habitat polygons and assign habitat to Optimal, Optimal-Suboptimal, Suboptimal, Suboptimal-Unsuitable, or Unsuitable
- Assess the management regime and impacts upon the habitat for Vertigo moulinsiana
- Use results to determine overall condition assessment

Management recommendations:
This site has no conservation designation and it is unlikely that the landowners are aware of the conservation importance of their land (they were away from home at time of 2016 survey). This means that it is vulnerable to destruction or change. Thus a priority at this site is to make contact with landowners.

A large drain which runs along the road side of polygons A and B has been cleared and opened up between 2012 and 2016, and it is likely that this is removing more water more quickly from the site, resulting in drying out. A large pond was dug (in late 1990s) to the north of Polygon B resulting in the loss of habitat. All such drainage and habitat removal works should cease at this site, and liaison with landowners will be necessary to ensure this.

There are coniferous forestry plantations at the south-west and north-east of this site, suggesting that planting up for forestry is another potential threat. Liaison with Coillte and/or the Forest Service about the importance of this site is also therefore needed. Given the fact that there is a vast dense mat of Holcus lanatus across much of Polygon A, the main area for the snail at the site, it may be possible that both drying out and some nutrient run-off (from adjacent agricultural land or forestry) are feeding into this. Polygon A would benefit from some short-term grazing in order to break up the mat of grass, but this type of habitat, if functioning properly, would not usually need grazers - it would be managed simply by the wetness, i.e. only wetland species would survive if it were consistently wet enough.

This site should be considered for designation as a Natural Heritage Area (NHA) or Special Area of Conservation (SAC) by NPWS, and it should be made known to Waterford County Council as an important area for biodiversity. In this way, possible future planning decisions can be made in an informed way, and any proposals for a change in land-use can be assessed properly.

2007-2012

Area of occupancy:

Discussion:

Monitoring recommendations:

Management recommendations: