

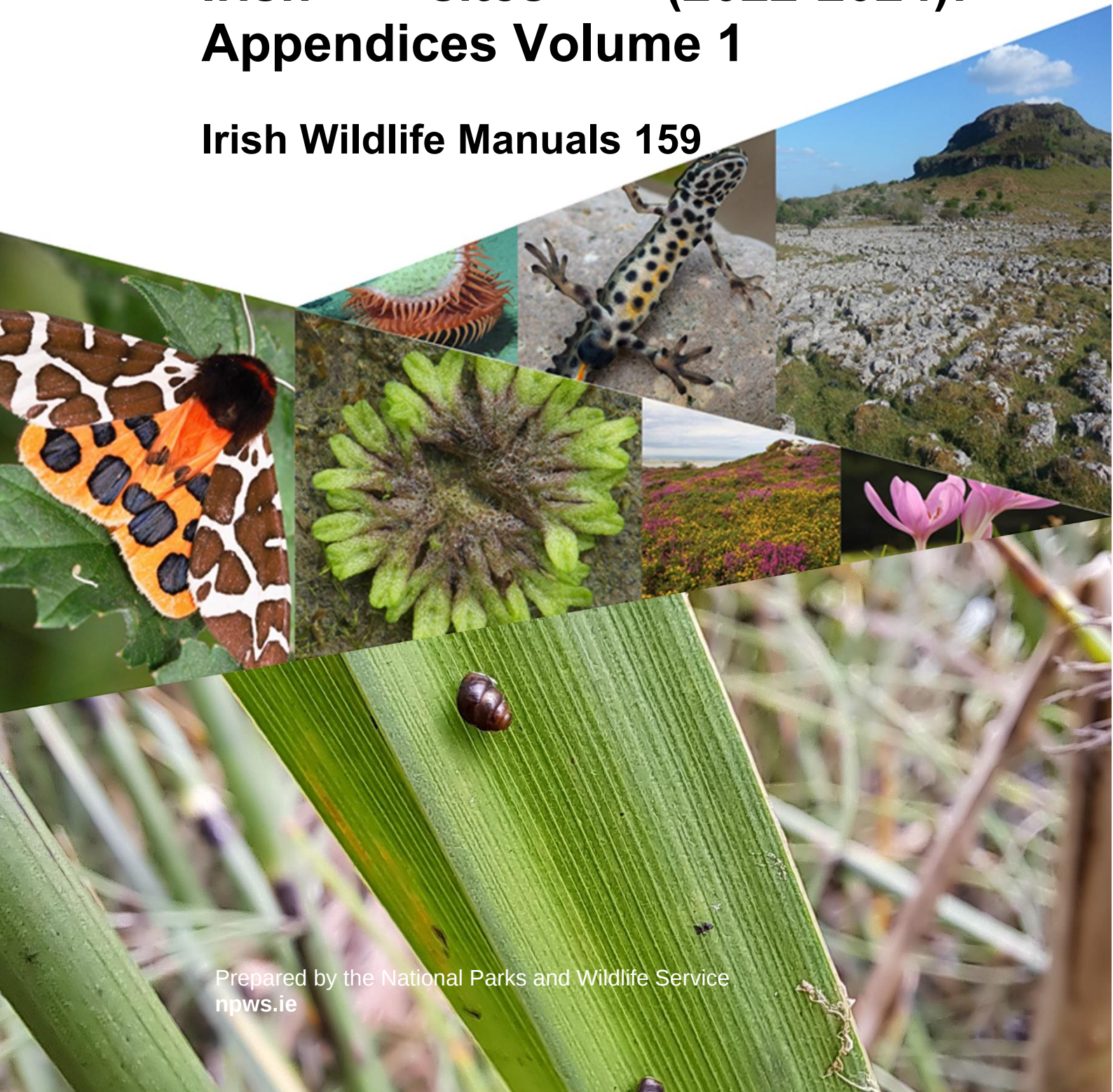


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National Parks and Wildlife
Service

Monitoring of three Annex II species of *Vertigo* snail on Irish sites (2022-2024): Appendices Volume 1

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Front cover, from left to right and top to bottom:

A deep water fly trap anemone *Phelliactis* sp., Yvonne Leahy; **Common Newt** *Lissotriton vulgaris*, Brian Nelson; **Limestone pavement**, Bricklieve Mountains, Co. Sligo, Andy Bleasdale; **Garden Tiger** *Arctia caja*, Brian Nelson; **Violet Crystalwort** *Riccia huebeneriana*, Robert Thompson; **Coastal heath**, Howth Head, Co. Dublin, Maurice Eakin; **Meadow Saffron** *Colchicum autumnale*, Lorcan Scott

Bottom photograph: **Desmoulin's Whorl Snail** *Vertigo moulinsiana*, Charleville Lake, Co. Offaly, John Brophy



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Appendix 1: Site summary paragraphs

Full details of each site surveyed are presented in the relevant site report in Appendices II-IV; however, a brief overview and the Overall Conservation assessment summary for each site is presented here. Note that for some sites, reference to the maps included within the individual site reports will be necessary to gain a full understanding of the issues raised.

1.1 *Vertigo angustior* site summaries

VaCAM01 – Beal Point

Overall assessment

Vertigo angustior continues to occur mainly within the core area of the site, but is very limited elsewhere, resulting in a Population Assessment of Unfavourable-Bad (red). The impact of undergrazing and overgrazing has resulted in less-than-optimal habitat across most of the site, with a Habitat Assessment of Unfavourable-Inadequate (amber). The pressures acting on the site and the likely future trends for Population and Habitat result in a Future Prospects Assessment of Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Beal Point is Unfavourable-Bad (red).

Site Summary

The core habitat for *Vertigo angustior* at Beal Point continues to be the fixed dune habitat in the centre of the site within Polygon A. There do not appear to have been significant changes to the distribution of the snail within the site since the previous two monitoring periods, with the exception of its appearance at the western end of the site. The habitat within the site is quite affected by historical agriculture, with abundant grasses such as *Arrhenatherum elatius* and *Dactylis glomerata*, particularly in areas away from the transect in Polygon A and in Polygon B. Polygon B is very rank, with low-growing *Rubus fruticosus* agg. to be found through the sward. Polygon C has been heavily grazed and, being dominated by broadleaved herbs, has very little *Festuca rubra* thatch. Slurry spreading and supplementary feeding was reported in 2003 and the nutrients from these activities may still be affecting the system. Both undergrazing and overgrazing is currently affecting the site, illustrating the difficulty in maintaining a suitable grazing regime. Polygon A is now under a farm plan, which includes winter grazing by cattle at a level of 1 unit per hectare (Barry O'Donoghue, NPWS, pers. comm.). This is at odds with the recommendations of Moorkens & Killeen (2011) who suggested no more than 0.8 livestock units per hectare from spring to autumn, though there are other, potentially competing, objectives when it comes to the conservation management of this site. No supplementary feeding should be undertaken, as this would serve to introduce additional nutrients into the system. Close attention must be paid to the response of the vegetation to any changes to the management of the site.

VaCAM02 – Derrynane

Overall assessment

Both the Population Assessment and the Habitat Assessment for Derrynane have dropped from Unfavourable-Inadequate (amber) to Unfavourable-Bad (red), while the Future Prospects remain Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Derrynane is Unfavourable-Bad (red).

Site summary

The habitat polygon for *Vertigo angustior* at Derrynane was expanded significantly after the 2015 survey, which recorded suitable habitat and the target species much more widely than the 2008 survey, which only recorded *V. angustior* along the transect. The site should be further expanded in the next round of monitoring due to work carried out by Mantell (2024), which extended the distribution of the snail at the site to the east and west of the current polygon. The site comprises an area of fixed dune fronted by Marram dunes along the back of Derrynane Beach, with two pools known to support Natterjack Toad (*Epidalea calamita*). While there are some minor pressures acting on the site, including trampling by recreational walkers, native and non-native scrub and tractor tracks, the most significant pressure is the rabbit population. It is clear that the rabbit population has grown significantly since the 2015 survey, with extensive burrows resulting in bare sand and most of the dunes have been virtually denuded of grasses (apart from the *Ammophila arenaria* along the back of the beach, though it has been lost from most of the fixed dune area). The dunes are, instead, dominated by bryophytes (mainly *Homalothecium lutescens* and *Pseudoscleropodium purum*) and broad-

leaved herbs. While the reduced distribution of the species across the site and the habitat damage caused by the rabbit population is of concern, the recent implementation of rabbit control measures by the OPW may facilitate the recovery of the site for *V. angustior*.

VaCAM03 – Dooaghtry

Overall assessment

The current survey has seen a significant decrease in the extent of the *Vertigo angustior* population at Dooaghtry, with a Population Assessment of Unfavourable-Bad (red), while the Habitat Assessment returned a result of Unfavourable-Inadequate (amber). The likely future trends for the site and the pressures acting on the site result in a Future Prospects Assessment of Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Dooaghtry is Unfavourable-Bad (red).

Site summary

Between the monitoring periods 2007-2012 and 2013-2018, the primary grazing at Dooaghtry was changed from cattle to sheep, and sheep grazing has continued to occur across the site. This has resulted in a more tightly-grazed sward across much of the site, though this appearance was somewhat confounded by the fact that the current survey was carried out earlier in the growing season than previous surveys. What is clear is that the population of *Vertigo angustior* has declined, with only one positive sample returned for the current survey. The intensity of the sheep grazing is likely to be the main contributor to this decline, but inundation by seawater during storms is also likely to play a role. A reduction in the level of sheep grazing would benefit the snail and its habitat by allowing the development of the *Festuca rubra* thatch across more of the site.

VaCAM04 – Glencolmcille

Overall assessment

Despite an improvement in the habitat suitability of Glencolmcille, resulting in a Habitat Assessment of Favourable (green), the Population Assessment and Future Prospects are Unfavourable-Bad (red) due to the fact that the snail was not found, and a range of pressures continue to act on the site. Based on these assessments, the Overall Assessment for Glencolmcille is Unfavourable-Bad (red).

Site summary

Vertigo angustior was once again absent from the site at Glencolmcille. This is the third monitoring survey in which the snail has not been found. This is despite the fact that some of the habitat on the site is suitable for the snail and has shown improvement since the 2013-2018 monitoring period. Whether the issue now is that the snail was lost from the site due to historical pressures and has not become re-established due to the isolation of the site, or that the pressures acting on the sites are still negatively affecting the suitability of the habitat in a less visible way, is not clear. For example, while the footprint of the cultivated plots growing potatoes is not extensive, it is possible that pesticides are being applied to the crops that are impacting on the mollusc community of the wider area, as virtually no snails were recorded from the samples taken for *V. angustior*. No grazing was occurring on the site at the time of survey; however, Moorkens & Killeen (2011) noted that there was winter grazing of sheep, and this is likely to be still occurring, as scattered wool was noted on the site. Given the length of time that has passed since the last record of *V. angustior* on the site, consideration may need to be given to implementing a reintroduction programme, should the habitat recover to a suitable state and appropriate long-term management enacted.

VaCAM05 – Kilshannig

Overall assessment

With the Population, Habitat and Future Prospects assessments all returning results of Unfavourable-Bad (red), the Overall Assessment for Kilshannig is Unfavourable-Bad (red).

Site summary

Vertigo angustior continues to be present at Kilshannig, but its distribution is becoming more restricted from monitoring period to monitoring period. In the current survey, only a single snail was found at one sample location. There does seem to be abundant suitable habitat on the site in terms of the vegetation, though

Festuca rubra litter can be sparse. As indicated by the transect data, the site appears to be generally drier than is optimal and local information suggests that the dune slacks did not flood in the winter before the survey (i.e. winter 2021). This drying may be the result of climate change affecting the hydrological cycle in the area and/or increased evaporation due to wind. Other pressures acting on the site include cattle and rabbit grazing. A slight reduction in the grazing pressure would benefit the habitat of the snail at this site, by allowing the build-up of *Festuca rubra* thatch.

VaCAM06 – Kinlackagh Bay

Overall assessment

Vertigo angustior was not recorded during the current survey, which resulted in a Population Assessment of Unfavourable-Bad (red), while the Habitat Assessment was also Unfavourable-Bad (red), due to the increased sheep grazing in the vicinity of the transect. These assessments, combined with future trends and pressures acting on the site, resulted in a Future Prospects assessment of Unfavourable-Bad (red) also. Based on these assessments, the Overall Assessment for Kinlackagh Bay is Unfavourable-Bad (red).

Site summary

Vertigo angustior was not recorded at Kinlackagh Bay during the current survey, which is a significant decline from the previous rounds of monitoring. In 2013-2018, the snail was found widely across the site, though in low numbers, but had been lost from the Transect. The site does appear to have extensive areas that have some suitability for the snail, though much of this area (Polygon C, in particular) has developed more recently due to an apparent reduction in the grazing pressure. Increased grazing by sheep and cattle in Polygon A has reduced the suitability of the habitat in this area, and grazing is an issue across the entire site. The management of grazing is critical to the recovery of this site in order to allow any low-density population of *V. angustior* that may still be present on site to expand across the dunes one more. The control and removal of *Hippophae rhamnoides* before it spreads beyond its current patch is also extremely important for the dune habitat in general as well as for *V. angustior* and its habitat.

VaCAM07 – Maharees

Overall assessment

The reduction in the number of positive *Vertigo angustior* samples means the Population Assessment remains Unfavourable-Bad (red), as does the Habitat Assessment. Due to the current pressures acting on this site and the lack of any positive trend for these factors, the Future Prospects are also assessed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Maharees is Unfavourable-Bad (red).

Site summary

Vertigo angustior continues to occur at Maharees, but at very low density, with only a single individual recorded during the current survey. This is a decline from the low but reasonably stable population recorded across the previous two monitoring periods. The habitat of the site remains largely unchanged, with some minor improvements due to an apparent slight drop in grazing in places; however, while tufts of *Ammophila arenaria* have become more frequent in these areas, the *Festuca rubra* thatch remains underdeveloped. The main visible pressure acting on the site is cattle grazing, which is occurring across 90% of the site, with invasive species (*Hippophae rhamnoides*, *Acer pseudoplatanus* and *Phormium tenax*) and the golf course affecting a smaller area. The less evident, but possibly more important pressure acting on the site appears to be a reduction in rainfall, with local information suggesting that the dune slacks did not fill in the winter of 2021/22. This change in hydrology may be having negative effects on the habitat suitability across the site in terms of soil/litter moisture. As there is nothing that can be done to address this issue at the site level, the focus should be on managing the grazing levels across the site, which will mostly involve a reduction in the stocking level. Discussions should be had with the landowners with regard to this.

VaCAM08 – Dog's Bay

Overall assessment

The Population and Habitat assessments for Dog's Bay returned a result of Unfavourable-Bad (red). As a result of this, and the positive future trends assigned to the two parameters, the Future Prospects were

assessed as Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Dog's Bay is Unfavourable-Bad (red).

Site summary

Vertigo angustior continues to hold out at Dog's Bay, with a single positive sample from the fixed dune habitat; the snail appears to have been lost from the grassy hollow at the northern end of the beach. The presence of the snail at the site is in spite of the continued decline in the habitat quality of the fixed dune habitat caused by a range of pressures, including grazing by cattle and sheep, erosion and the associated wind-blown sand, and trampling by walkers. If no action is taken, it is likely that the snail will be lost from the site. The Gurteen Bay & Dog's Bay Conservation Group has had a conservation management plan (Heffernan, 2022) prepared to address the damage to the fixed dune habitat from the various pressures and its implementation will be vital to the continued survival of *V. angustior* at the site. In relation to future monitoring, the habitat and population criteria may need to be altered to better reflect the wider site in the future, as the current criteria are limited to the grassy hollow with the freshwater upwelling, despite the snail occurring in the wider dunes.

VaCAM10 – Killanley Glebe

Overall assessment

The significant drop in the population of *Vertigo angustior* at Killanley Glebe compared to previous monitoring periods resulted in a Population Assessment of Unfavourable-Bad (red). Despite this, the Habitat Assessment returned a result of Favourable (green), as the habitat in Polygon A continues to appear suitable. Based on these assessments and their likely future trends, the Future Prospects for the site are assessed as being Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Killanley Glebe is Unfavourable-Bad (red).

Site summary

Vertigo angustior was not recorded at Killanley Glebe during the current survey. This is a dramatic drop in the population compared to the previous rounds of monitoring. Despite this drop, there is no clear cause. The habitat in Polygon A still appears to be optimal, comprising flushed wet grassland and *Iris pseudacorus* marsh. The planted woodland in Polygon B continues to develop and so this area is Unsuitable. The only pressure noted for Polygon A was sheep grazing, but this does not appear to be at a level that is negatively affecting the habitat. It is recommended that discussions be had with the landowner to see if any change in management over the last 15 years can be found that would explain the population decline. The apparent removal of cattle from the site may be a factor, and their return (at low grazing level) may be an approach worth considering.

VaCAM11 – Lahinch

Overall assessment

As *Vertigo angustior* was not recorded during the current survey, the Population Assessment returned a result of Unfavourable-Bad (red). There continues to be a good area of suitable habitat for the snail, despite some decrease in suitability along the transect route, leading to a Habitat Assessment of Unfavourable-Inadequate (amber). In light of these assessments, and the pressures acting on the site the Future Prospects are considered to be Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Lahinch is Unfavourable-Bad (red).

Site summary

Vertigo angustior was not recorded from the site at Lahinch during the current survey, which is a further drop from the single positive sample recorded in 2013-2018. This contrasts starkly with the 17 positive samples recorded in 2009. Despite the site comprising two golf courses (the Old Course to the west and the Castle Course to the east), with the associated managed tees, greens, and fairways, the rough areas generally provide suitable habitat for the snail. However, the apparently suitable habitat does not appear to be capable of supporting the snail and it is unclear as to why this is the case. It is possible that there have been recent changes to the management of the golf courses, for example, in the application of pesticides. Discussions should be had with Lahinch Golf Club to ascertain if there have been any changes to the management of the site in the last 15 years.

VaCAM12 – Malin Dunes

Overall assessment

The Habitat Assessment for Malin Dunes remains Unfavourable-Bad (red), while the Population Assessment has also dropped to Unfavourable-Bad (red). The Future Prospects were assessed as Unfavourable-Bad (red), both Population and Habitat are Unfavourable-Bad (red) and neither has a positive future trend. Based on these assessments, the Overall Assessment for Malin Dunes is Unfavourable-Bad (red).

Site summary

Malin Dunes comprises an extensive sand dune system with large areas, across which the suitability for *Vertigo angustior* varies. The best of the habitat continues to occur along the section of the dunes closest to the shore, though coastal erosion has destroyed formerly suitable habitat and the associated increase in blown sand has further negatively impacted on the habitat more inland in proximity to the eroded stretch. The effect of erosion and blown sand has notably impacted on the result of the habitat and populations assessments of the site, as the area where the transect was located has been significantly altered by these factors.

The landward sections of the dunes are more subject to grazing pressure from cattle, sheep and rabbits, which has reduced the suitability of the habitat and resulted in areas with abundant *Ammophila arenaria* but limited associated *Festuca rubra* thatch, as it has been grazed away. The grazing and associated supplementary feeding has also increased the agricultural character of the site, with species such as *Trifolium repens*, *Cirsium arvense*, *Cirsium vulgare* and *Lolium perenne* found in patches throughout the site.

The site would benefit from a reduction in the grazing level and supplementary feeding. The rabbit population and its impact on the fixed dune habitat must be closely monitored, as, if left unchecked, this could lead to major damage to fixed dune habitat in general and *Vertigo angustior* habitat in particular, as evidenced by the situation at Derrynane, Co. Kerry.

Addressing the coastal erosion issue is likely to be particularly challenging into the future.

VaCAM13 – Pollardstown Fen

Overall assessment

Vertigo angustior was not recorded from the site and the area and quality of suitable habitat have reduced, resulting in Population and Habitat assessments of Unfavourable-Bad (red). Due to these assessments and the pressures acting on the site, the Future Prospects are also assessed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Pollardstown Fen is Unfavourable-Bad (red).

Site summary

Vertigo angustior was not recorded from Pollardstown Fen during the current survey. The previous round of monitoring recorded the snail from a single sample, where only a single individual was found, which represented a significant decline from the 2007-2012 monitoring period. For this reason, the Population Assessment continues to be Unfavourable-Bad (red), as does the Habitat Assessment due to the habitat being either too rank where there is no grazing, or too impacted by grazing where horses have access to it. The areas grazed by horses would benefit from the temporary removal of access to allow the vegetation to become more developed and prevent poaching. If possible, some form of grazing should be introduced to Polygon A where the vegetation has become rank, with limited removal of trees also a possibility.

VaCAM14 – Streedagh Point Dunes

Overall assessment

The Population Assessment returned a result of Unfavourable-Inadequate (amber) due to the drop in the number of positive samples along the transect, while the Habitat Assessment similarly returned a result of Unfavourable-Inadequate (amber) due to drying along the transect. Based on these results and their future trends in light of the threats and pressures acting on the site, Future Prospects are considered to also be Unfavourable-Inadequate (amber). Therefore, the Overall Assessment for Streedagh Point Dunes is Unfavourable-Inadequate (amber).

Site summary

The site at Streedagh Point Dunes continues to support abundant suitable habitat for *Vertigo angustior*, with a good population distributed across the site. However, the site is not without its issues, with a drop in the number of positive samples since the 2013-2018 monitoring period noted during the current survey. The transect, in particular, saw a decline in the number of positive samples compared to the two previous rounds of monitoring, with drying out of the *Festuca rubra* thatch and underlying soil appearing to have had a negative effect on the suitability of the habitat despite the favourable vegetation. This drying out is assumed to be the result of changes to precipitation and/or wind patterns as a result of climate change. While grazing at the site is considered to be suitable overall, Conor's Island (Polygon A) is overgrazed by sheep and horses. Other more localised pressures include erosion, dumping, walking and trampling, and problematic native/invasive non-native species. With climate change and erosion largely beyond the scope of any site management measures, the main focus should be on addressing the issue of overgrazing in Polygon A and maintaining an appropriate level of grazing elsewhere. This measure may offset some of the issues caused by climate change by providing more *Festuca rubra* litter to retain some moisture close to the soil. Targeted control of problematic native/invasive non-native species would also be beneficial.

VaCAM15 – Bartraw

Overall assessment

The site at Bartraw supports a strong *Vertigo angustior* population, with abundant suitable habitat present, particularly on the island at the northern end of the site. This has resulted in Favourable (green) assessments for both of these elements. Future Prospects were also assessed as Favourable (green), thus giving an Overall Assessment for Bartraw of Favourable (green).

Site summary

The site at Bartraw comprises a former island and the sand and cobble spit connecting it to the mainland. The former island (Polygon A) supports abundant habitat suitable for *Vertigo angustior* in the form of fixed dune dominated by *Festuca rubra* grassland with *Ammophila arenaria*. The dune habitat along the spit has been heavily impacted by storm-related erosion and deposition of cobbles on former fixed dune habitat. As well as the impact of this pressure, paths trampled by human walkers and horse-riders have had an intense, if spatially limited, impact on the fixed dune habitat. Rabbit grazing was noted within Polygon A, albeit at a low level that is not currently having an impact on the *Vertigo angustior* habitat. However, the rabbit population and its impact on the fixed dune habitat must be closely monitored, as, if left unchecked, this could lead to major damage to fixed dune habitat in general and *Vertigo angustior* habitat in particular, as evidenced by the situation at Derrynane, Co. Kerry.

VaCAM16 – Inishmore Island

Overall assessment

Vertigo angustior was not recorded at Inishmore Island during the current survey, resulting in a Population Assessment of Unfavourable-Bad (red), while the Habitat Assessment and Future Prospects also returned Unfavourable-Bad (red) results. This results in an Overall Assessment for Inishmore Island of Unfavourable-Bad (red).

Site summary

The site at Inishmore Island comprises two widely separated areas; one at Cill Mhuirbhígh and the other around the Inishmore aerodrome. The habitat at Inishmore comprises fixed dune habitat and machair grassland. Most of this area is likely subject to grazing, particularly polygon B, which had a small number of cattle present at the time of survey, though there was no evidence of active grazing in the other polygons here. The cattle grazing has resulted in a reduction in the suitability of the area for *Vertigo angustior* via the removal of taller vegetation and the grassy thatch that provides the required microclimate for the species. Even where the classic *Ammophila arenaria*/*Festuca rubra* sward is well developed in Polygon A, the habitat is drier than would be optimal for the snail. Outside of the grazed areas (which are consequently more prone to drying out), the cause of this drying is not clear. It is assumed that this drying out is due to weather/climate changes that have reduced precipitation and/or increased drying conditions.

The habitat around Inishmore aerodrome is of lower potential suitability. While it also comprises fixed dune and maritime grassland, it generally has a well-developed bryophyte layer and limited *Festuca rubra* in the sward, resulting in only small areas that have suitability for *Vertigo angustior*. Part of the reason bryophyte cover is so high may be due to the presence of rabbits in this location, whereby they are preferentially grazing down the grasses and thus allowing the bryophytes to dominate.

The combination of pressures acting on the *Vertigo angustior* habitat at Inishmore Island has resulted in a decline in the population, with no *V. angustior* found during the current survey, continuing the trend that was evident from the prior monitoring periods. While the control of cattle grazing may restore some of the suitability to the habitat within Polygon B, the drying out that is evident across the rest of the site is not likely to be something that can be managed at a local level.

VaCAM17 – Curragh Chase

Overall assessment

The Population Assessment returned a result of Unfavourable-Bad (red) due to the fact that the snail was not recorded during the current survey, while a reduction in the habitat suitability along the transect and across the site in general also resulted in a Habitat Assessment of Unfavourable-Bad (red). With no indication of any action to improve these assessments, the Future Prospects were assessed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Curragh Chase is Unfavourable-Bad (red).

Site summary

The *Vertigo angustior* site at Curragh Chase continues to deteriorate, with the snail not being recorded during the current survey. The areas that are defined as *Vertigo moulinsiana* habitat (southwest corner and a band running north across the middle of the site) are too wet for *V. angustior*. Other areas have become quite rank, usually with a dense grassy sward, and thick, wet *Juncus* spp. and grass litter in places. Vegetation that matches the description of optimal or suboptimal habitat for the species is limited or possibly absent. The site is subject to some low-level grazing by cattle and is also likely to be affected by nutrient inputs. The management required for *V. angustior* (some level of grazing to maintain a lighter thatch and for the development of a bryophyte layer) is at odds with that required for *V. moulinsiana* (virtually no grazing, in order to allow suitable tall vegetation to develop). Temporary electric fences seem to be partially in place to prevent cattle from entering the wetter fen areas, which may be for reasons of cattle husbandry or to reduce impacts on *V. moulinsiana* habitat. As *V. moulinsiana* is a Qualifying Interest for the Curraghchase Woods SAC, it is likely that this is the species that should be favoured by any management intervention. However, the *V. moulinsiana* population around the lakes of Curragh Chase Forest Park suggests that its continued presence within the SAC is not at risk.

VaCAM19 – Louisa Bridge

Overall assessment

The Population Assessment returned a result of Unfavourable-Bad (red) due to the fact that the snail was not recorded during the current survey, while a reduction in the habitat suitability across the site in general also resulted in a Habitat Assessment of Unfavourable-Bad (red). With no indication of any action to improve these assessments, the Future Prospects were assessed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Louisa Bridge is Unfavourable-Bad (red).

Site summary

Vertigo angustior was not recorded from Louisa Bridge during the current survey and has now not been recorded in 27 years (last recorded in 1997). The habitat has shown some decline in suitability, with the general loss of the *Iris pseudacorus* marsh with a bryophyte understorey and the spread of denser vegetation and litter, unsuitable for the snail. With succession in the form of encroaching *Salix* spp. the only pressure noted at the site, the sensitive manual removal of scrub is the only feasible management action that can be undertaken that may improve the site for the snail. Given the delicate nature of the tufa springs on the site, any such work would need to be approached in a manner that would prevent trampling or damage to the tufa slopes.

VaCAM20 – Ballysadare Bay

Overall assessment

Population Assessment for Ballysadare Bay is Unfavourable-Bad (red) due to the drop in the number of positive samples along the transect and across the site, while the Habitat Assessment is Unfavourable-Bad (red) due to reduction in the habitat suitability along the transect in terms of vegetation structure and soil moisture. Based on these results and their future trends in light of the threats and pressures acting on the site, the Future Prospects Assessment is also considered to be Unfavourable-Bad (Red). Therefore, the Overall Assessment for Ballysadare Bay is Unfavourable-Bad (red).

Site summary

Ballysadare Bay continues to support abundant habitat suitable for supporting *Vertigo angustior*, with the best of the habitat still in Polygon A. The number of positive samples has dropped compared to the previous two monitoring periods, and the habitat in Polygon A has shown some decline in suitability in terms of becoming more rank and drying out. This drying out is assumed to be the result of changes to precipitation and/or wind patterns as a result of climate change. Most of the other pressures acting on the site are minor and include erosion, camping, problematic native/invasive non-native species and dumping. The introduction of light grazing may be considered for Polygon A to open up the habitat slightly and prevent it becoming too rank; however, there should be no supplementary feeding. The chestnut fencing installed to attempt to restore the blowout in Polygon C does not appear to be having the desired effect, and additional measures may be required, such as planting *Ammophila arenaria*.

VaCAM21 – Strandhill Airport

Overall assessment

The drop in the number of positive samples and the largely unchanged status of the habitat at Strandhill Airport means that the Population and Habitat Assessments returned results of Unfavourable-Bad (red). In light of these results and the pressures acting on the site (scrubbing over, erosion and drying out due to climate change), the Future Prospects were also assessed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Strandhill Airport is Unfavourable-Bad (red).

Site summary

The habitat for *Vertigo angustior* at Strandhill Airport has shown some decline in suitability and area since monitoring began. Though there has been some stabilisation of this decline, there are still pressures acting on the site including succession, erosion and drying out. The reduction in habitat quality appears to be having negative effects on the population of *V. angustior*, with only a single sample returning a positive result during the current survey, which continues the declining trend seen across the previous two monitoring periods. While the populations of species such as *V. angustior* can fluctuate year-to-year, the current decline does appear to be genuine, as it coincides with habitat issues and aligns with the pressures acting on the site. The site is largely unmanaged and was considered to be maintained mainly by natural elements; however, it had been noted over the previous monitoring rounds that grazing may need to be introduced to address the spread of bryophyte mounds and *Salix cinerea*. At this stage, it is recommended that this measure be implemented, with light cattle grazing (without supplementary feeding) introduced to the site. Grazing must be carefully monitored and set at a level that maintains the habitat for the snail and the site's other Qualifying Interests.

VaCAM22 – Waterstown Lough

Overall assessment

Vertigo angustior was not recorded from the site and the area and quality of suitable habitat has reduced, resulting in Population and Habitat assessments of Unfavourable-Bad (red). Due to these assessments and the pressures acting on the site, the Future Prospects are also assessed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Waterstown Lough is Unfavourable-Bad (red).

Site summary

Vertigo angustior was not recorded from Waterstown Lough during the current survey. The previous round of monitoring recorded the snail from a single sample, where only a single individual was found, so the population appears to be sparse. The area of suitable habitat has contracted since the previous survey, with the lack of a well-developed litter and bryophyte layer noted. The main pressure acting on the site is grazing by 23 cattle that have access to the *V. angustior* habitat and the adjacent fen and grasslands. Two houses have been built, or are in the process of being built, above the site, though there is no sign of them having a negative effect on the habitat. It is recommended that the grazing level be reduced slightly by excluding animals from the area for a time, or reducing the numbers overall. This is required to allow the litter layer to develop. As all three Annex II *Vertigo* species have been recorded from this site, it is important that the requirements of all three species be considered in any changes to management.

1.2 *Vertigo geyeri* site summaries

VgCAM01 – Meenaphuil

Overall assessment

As in the previous two rounds of monitoring, the Population, Habitat, and Future Prospects assessments all returned a result of Favourable (green). For this reason, the Overall Assessment for Meenaphuil is Favourable (green).

Site summary

Meenaphuil continues to be an excellent, if small, site for *Vertigo geyeri*. The snail was recorded at both sample locations along the transect, as it was in the previous two rounds of monitoring. The site continues to support good habitat for the snail generally and along the transect. The fence that previously split the transect in two has been moved to the north and no longer bisects the transect, also resulting in the habitat polygon falling within a single habitat unit. The area is grazed non-intensively by sheep and the stocking density appears to be at or close to the optimal level required for the maintenance of the *V. geyeri* habitat, and so should be kept at this level. The Ben Bulbin, Gleniff and Glenade Complex SAC has numerous Qualifying Interests, some of which will have competing management requirements. For this reason, any changes to management practices for the purposes of improving the conservation status of the SAC will need to be cognisant of these contrasting requirements.

VgCAM02 – Tievebaun

Overall assessment

The Population Assessment returned a result of Favourable (green) once expert judgement was applied to address the limited habitat along the transect, as all samples were positive. The Habitat Assessment was Unfavourable-Inadequate (amber), after expert judgement was used to upgrade it from Unfavourable-Bad (red), as it was felt that the slight loss of suitable habitat along the transect would have a disproportionate effect on the result. The Future Prospects were assessed as Unfavourable-Inadequate (amber), in light of the above assessments and future trends. For this reason, the Overall Assessment for Tievebaun is Unfavourable-Inadequate (amber).

Site summary

Tievebaun continues to be an excellent site for *Vertigo geyeri*, with extensive suitable habitat spread along the slope of Tievebaun Mountain. The snail was recorded at both sample locations along the transect, similar to the previous two rounds of monitoring, when three samples along the transect were positive. The site continues to support good habitat for the snail generally and along the transect; however, the length of suitable habitat along the transect has declined since the previous round of monitoring. This is due to the drying out of some runnel areas and associated changes in vegetation. The site is grazed non-intensively by sheep and the stocking density appears to be at or close to the optimal level required for the maintenance of the *V. geyeri* habitat, and so should be kept at this level. The exception to this is the part of Polygon A where the transect is located, which is somewhat undergrazed. The Ben Bulbin, Gleniff and Glenade Complex SAC has numerous Qualifying Interests, some of which will have competing management requirements. For this reason, any changes to management practices for the purposes of improving the conservation status of the SAC will need to be cognisant of these contrasting requirements.

VgCAM03 –Brackloon

Overall assessment

The Population, Habitat, and Future Prospects assessments all returned a result of Unfavourable-Bad (red). For this reason, the Overall Assessment for Brackloon is Unfavourable-Bad (red).

Site summary

The site at Brackloon is located at the northwestern end of the infilled Brackloon Lough, and is set in a cutover bog landscape with calcareous flushing. No *Vertigo geyeri* were recorded during the current survey, despite the presence of suitable habitat in the southeastern part of the site. While the snail was not recorded from

the transect in either of the previous monitoring periods, the flush habitat was positive in both. This suggests a real decline in the population of *V. geyeri* at Brackloon. Despite the apparent drop in the population, suitable habitat remains at the site and there were no pressures identified at the site that would explain this drop. There are signs of deer grazing and *Pinus contorta* saplings have grown up in places. Given the lack of any clear pressure acting on the site, no management recommendations can be made that would address the population loss at the site.

VgCAM04 – Clonaslee Eskers

Overall assessment

As in the previous round of monitoring, the Population, Habitat, and Future Prospects assessments all returned a result of Unfavourable-Bad (red). For this reason, the Overall Assessment for Clonaslee Eskers is Favourable (green).

Site summary

Vertigo geyeri was not recorded from Clonaslee Eskers during the current survey. This is a repeat of the results from the previous two rounds of monitoring, with the snail last recorded in 1998. The habitat suitability continues to decline, with the site being generally rank and the soil being either too dry or showing signs of fluctuating water levels, suggested alternating flooding/drying out events. Cattle have previously been known to graze the site, and there was a nose pump associated with the dry pool in Polygon A during the current survey; however, no livestock were noted on site during the current survey. It is understood that the landowner had recently passed away, which may be the cause of the removal of livestock. In Polygon D, *Schoenus nigricans* tussocks show signs of being topped by a digger, which may represent a conservation measure aimed at reducing the shading of *V. geyeri* habitat. In order to restore the site to a condition more suitable for the survival of *V. geyeri*, the hydrological situation needs to be investigated and remedied in a way that will result in consistently wet alkaline fen habitat.

VgCAM05 – Dooaghtry

Overall assessment

The Population Assessment returned a result of Unfavourable-Inadequate (amber) due to the fact that *Vertigo geyeri* was only recorded on the transect, while the Habitat Assessment was Favourable (green). Due to these results and the current pressures acting on the site, the Future Prospects are considered to be Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Dooaghtry is Unfavourable-Inadequate (amber).

Site summary

Dooaghtry continues to support suitable habitat for *Vertigo geyeri*, with the best of the habitat located around Dooaghtry Lough. Elsewhere in the site, the *V. geyeri* habitat comprises small flush areas in the hills above. During the current survey, the snail was only found along the transect beside the lough and not in other polygons, despite small patches of suitable habitat being present across the site. This shows a decline in the number of positive samples as compared to the previous monitoring periods, though the cause of this decline is unclear. Away from the transect, the habitat is often tall and rank, which is unsuitable for the snail, but suitable habitat does continue to occur in patches among this taller vegetation. Sheep grazing is maintaining the good habitat where it occurs, though an appropriate increase in grazing pressure would be likely to benefit the snail by controlling the taller vegetation.

VgCAM06 – Drimmon Lough

Overall assessment

The Population, Habitat, and Future Prospects assessments all returned a result of Unfavourable-Bad (red), which shows a decline at the site across the three rounds of monitoring. For this reason, the Overall Assessment for Drimmon Lough is Unfavourable-Bad (red).

Site summary

The site at Drimmon Lough continues to decline in quality for *Vertigo geyeri*, as was noted by the previous round of monitoring. No *V. geyeri* were recorded from the site during the current survey. Despite the fen vegetation still being suitable for the snail, the soil moisture level was too low at the time of survey. Given the snapshot nature of the survey, it cannot be determined if this is a long-term situation; however, such fen habitat tends to have a stable water table, which is what makes it suitable for supporting *V. geyeri* in the first place. The cause of this drying out could not be identified and could be the result of climate change effects or more local pressures, such as abstraction from the lough or the local groundwater. The cattle grazing on the site is considered to be having an overall positive effect on the habitat by keeping the sward short and open. The drain bisecting the habitat polygon seems to be largely non-functional, with a high water table and heavily vegetated. Discussion with the landowner may help in identifying the cause of the site drying out.

VgCAM08 – Sheskinmore

Overall assessment

The Population, Habitat, and Future Prospects assessments all returned a result of Favourable (green), which shows an improvement since 2013-2018 when the Habitat Assessment was Unfavourable-Bad (red). For this reason, the Overall Assessment for Sheskinmore is Favourable (green).

Site summary

Sheskinmore continues to be an excellent site for *Vertigo geyeri* and is an important example of the positive effect of implementing the appropriate management measures. While seven of the eight samples were positive for the snail in 2013-2018, the site was assessed as being Unfavourable-Bad (red) due to issues around poaching and drying out along the transect, leading to a Habitat Assessment of Unfavourable-Bad (red). The management that has been implemented by the NPWS since then (light grazing by cattle and Polish Konik ponies, and the use of the sluice to maintain an appropriate water level) has seen the poaching and drying-out issues subside and resulted in the Habitat Assessment improving to Favourable (green). The current management regime should be continued, with the habitat checked occasionally to ensure that the current level of grazing is still appropriate to the needs of *Vertigo geyeri*.

VgCAM09 – Annaghmore Lough

Overall assessment

The Population, Habitat, and Future Prospects assessments all returned a result of Unfavourable-Bad (red). For this reason, the Overall Assessment for Annaghmore Lough is Unfavourable-Bad (red).

Site summary

The suitability of the site at Annaghmore Lough for *Vertigo geyeri* has declined over recent years. The snail was recorded from four transect samples in 2007-2012, but was absent during the 2013-2018 monitoring period survey and the current survey. This population decline is the result of a reduction in the habitat suitability, with all sample locations being too dry to support the snail. Even where the vegetation is still suitable, the soil moisture is just too dry. The cause of this drying out cannot be identified definitively, but is assumed to be the result of changes to precipitation caused by climate change. The only other pressures noted on the site were overgrazing of a small area by a horse and donkeys, and a small patch of the invasive species *Cotoneaster horizontalis*. No management can be implemented to address the effects of climate change at a local level, but discussions should be had with local landowners to see if any local activities can be identified that may be having an effect on the water levels of the lough and its surrounding fen.

An area of fen habitat southeast of the small lough in the southeastern lobe of the Annaghmore Lough (Roscommon) SAC was visited during the current survey, but no suitable habitat was found.

VgCAM10 – Ballyness Bay

Overall assessment

The Population Assessment returned a result of Unfavourable-Bad (red) due to the snail not being recorded during the current survey, while the Habitat Assessment is Unfavourable-Inadequate (amber). Due to these assessments and the lack of any positive trend for the site, the Future Prospects are assessed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Ballyness Bay is Unfavourable-Bad (red).

Site summary

Vertigo geyeri was not recorded from Ballyness Bay during the current survey, which indicates a continued decline since the 2007-2012 monitoring period. The site continues to maintain suitable habitat (within Polygon A), though it is patchy, and there has been some reduction in the cover of suitable habitat along the transect, resulting in a drop in the Habitat Assessment from Favourable (green) to Unfavourable-Inadequate (amber). The management of the site is by light cattle grazing, and this does not appear to be having a negative impact, but rather a positive one by keeping the vegetation from becoming rank. It is suggested that the grazing of the site should switch to sheep, as they are lighter and pose a lesser risk of trampling and poaching.

VgCAM13 – Easkey Valley

Overall assessment

The Population, Habitat, and Future Prospects assessments all returned a result of Unfavourable-Bad (red). For this reason, the Overall Assessment Easkey Valley is Unfavourable-Bad (red).

Site summary

The *Vertigo geyeri* site at Easkey Valley is spread across a large number of polygons and generally comprises small flushes creating a mosaic with other habitats. The snail was not found during the current survey, which is a further decline since the last round of monitoring when the Population Assessment was still Unfavourable-Bad (red), but the snail was recorded from one sample location. This compares to 50% positive samples in 2007-2012, when the Population Assessment was Favourable (green). There does appear to have been a genuine reduction in the area of suitable habitat, which has led the Habitat Assessment to drop from Favourable (green) in the two previous monitoring rounds, to Unfavourable-Bad (red). Some of this is due to agricultural improvement, while elsewhere the habitat has become too dry or too wet. Grazing by sheep is the main management activity, which is appropriate for the maintenance of the snail's habitat, with cattle access possible to Polygon N (though the lack of grazing and better alternatives suggest it is rarely

frequented). A small area of suitable habitat has been lost by drain clearance along the road verge in Polygon B. As the specific cause of the decline in the *Vertigo geyeri* population at Easkey Valley is difficult to identify, it is also difficult to propose appropriate management changes that could address the issue. Generally, the level of grazing by sheep is appropriate, keeping the flush vegetation open and low. If possible, sheep grazing could be attempted in Polygon N to control the rank vegetation without greatly damaging the underlying tufa slope. Supplementary feeding should be avoided within the *V. geyeri* habitat areas.

VgCAM14 – Polaguil Bay

Overall assessment

The Population Assessment, Habitat Assessment and Future Prospects are assessed as Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Polaguil Bay is Unfavourable-Inadequate (amber).

Site summary

The site at Polaguil Bay continues to support a good population of *Vertigo geyeri* and reasonably extensive areas of suitable habitat. The distribution of the species remains the same as 2013-2018, with four positive samples from Polygons A-C and no positive samples from Polygon E, where the transect is located. The best of the habitat continues to occur within the commonage area (polygons A-D), where sheep grazing keeps the vegetation generally short and open, though some areas have become dominated by *Schoenus nigricans* and *Molinia caerulea* tussocks, and *Juncus subnodulosus*. This contrasts somewhat with the privately-owned land, which is also sheep-grazed, but has seen the spread of *J. subnodulosus* in the flush area east of the fence-line through Polygon C, while Polygon E is largely unsuitable due to rank *S. nigricans* and *M. caerulea* tussocks shading out suitable habitat (it should be noted that suitable habitat here was always restricted to several runnels traversing the polygon). Sheep grazing is the main pressure acting on the site and it is currently at a level that is having a positive effect for the snail. The other aspect that is negatively affecting the suitability for the site for *V. geyeri* is that the water flowing down the runnels in Polygon E has eroded a narrow channel down to the stony substratum, thus increasing the flow rate and reducing the flushing effect to the surrounding habitat. While management should continue a similar level of sheep grazing, options for reducing the cover of *S. nigricans*, *M. caerulea* and *J. subnodulosus* should be investigated, though it may be difficult or impossible to achieve through sheep grazing alone.

VgCAM15 – Silver River

Overall assessment

The Population, Habitat, and Future Prospects assessments all returned a result of Unfavourable-Bad (red). For this reason, the Overall Assessment for Silver River is Unfavourable-Bad (red).

Site summary

Vertigo geyeri was not recorded at Silver River during the current survey. This compares with six positive samples from eight in 2007-2012 and four positive samples from eight in 2013-2018, indicating a continued decline in population at the site. This decline has seen the Population Assessment drop from Favourable (green), in the previous two rounds of monitoring, to Unfavourable-Bad (red). The population decline reflects the decline in the habitat at the site, with the Habitat Assessment dropping from Favourable (green) in 2007-2012 to Unfavourable-Inadequate (amber) in 2013-2018, to Unfavourable-Bad (red) in the current survey. The site was expanded during the last round of monitoring due to the discovery of calcareous flush habitat upslope of the existing site and led to the creation of Polygon C. However, since the last round of monitoring, this area has been drained and the suitable habitat lost. The newly installed or cleared drains may also have affected the tufa slope that runs along the eastern boundary of Polygon A, which is now drying out. This has caused a dramatic reduction in brown mosses and the area is now dominated by more grassland-like vegetation. Grazing at the site by cattle, sheep, horses and deer is overall considered to be having a slightly positive effect by keeping the vegetation from becoming rank, though a slight reduction in the grazing level in Polygon B may reduce the effects of trampling and allow the bryophyte layer to become more developed.

VgCAM16 – Fermoyle

Overall assessment

The Population Assessment returned a result of Unfavourable-Inadequate (amber), while the Habitat Assessment was Unfavourable-Bad (red), with Future Prospects also Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Fermoyle is Unfavourable-Bad (red).

Site summary

The site at Fermoyle comprises a mosaic of habitats including transition mire (7140), rich fen (7230 and non-Annex PF1), active blanket bog (*7130) and degraded blanket bog supporting secondary wet heath (4010). The suitable habitat for *Vertigo geyeri* is sparsely interspersed throughout, typically confined to seepage zones and the edges of pools, but never forming large areas. Extensive areas of the site, particularly in Polygon B, are quaking and very wet. The site continues to support the snail in the northern section, though the habitat is becoming more limited, as *Schoenus nigricans* and *Molinia caerulea* tussocks develop and shade out the understorey of brown mosses and *Carex lepidocarpa*. The loss of habitat is likely due to the fact that the area is undergrazed. While evidence of cattle grazing was present in 2013-2018, only signs of deer grazing were evident during the current survey. This has allowed the development of taller vegetation, which impacts negatively on *V. geyeri* habitat. Scattered Lodgepole Pine (*Pinus contorta*) saplings and seedlings are present on the site, having spread from nearby plantations, but the effect is very limited. If possible, some extensive grazing should be reintroduced to the area, though due to its very wet nature, this may prove difficult and would need to be monitored closely to ensure poaching does not impact on the fragile flush habitats.

VgCAM18 – Fin Lough

Overall assessment

The Population Assessment returned a result of Unfavourable-Bad (red), while the Habitat Assessment was Favourable (green), with Future Prospects also Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Fin Lough (Offaly) is Unfavourable-Bad (red).

Site summary

There has been little apparent change at Fin Lough since the previous monitoring periods in terms of habitat and management; however, a decline has been noted in the Population of *Vertigo geyeri* at the site. In the current survey, the snail was only recorded from one of seven samples, resulting in a Population Assessment of Unfavourable-Bad (red), which contrasts with the Favourable (green) for the previous two monitoring periods. The result of the Habitat Assessment was Favourable (green) in the current survey, as it was previously. Parts of the site are grazed by cattle and this has led to some poaching and loss of suitable vegetation. The ungrazed parts of the site depend on wetness to retain suitable vegetation for the snail, but this is not sufficient in some areas (particularly the *Schoenus* fen in Polygon C), where the vegetation is becoming too tall. Restoring areas that have seen the development of tall *Schoenus nigricans* tussocks is difficult, as grazers tend to work around them rather than graze them down. The overall management of the site is difficult due to its sensitivity to poaching, though access by livestock to polygons A and D should be restricted (though not necessarily prevented entirely). Some consideration may be given to the suggestion by Moorkens & Killeen (2011) that topping of *Schoenus nigricans* tussocks in Polygon C may benefit *Vertigo geyeri* and its habitat.

VgCAM20 – Lisduff Fen

Overall assessment

The Population and Habitat assessments returned a result of Unfavourable-Bad (red), as did the Future Prospects assessment. Based on these assessments, the Overall Assessment for Lisduff Fen is Unfavourable-Bad (red).

Site summary

Vertigo geyeri was not recorded from Lisduff Fen during the current survey, nor was it recorded during the previous monitoring period. This indicates a clear decline from the 2007-2012 monitoring period when it was recorded at more than half the sample locations. This decline in the snail's population is reflective of the changes to the habitat, with the site showing signs of drying out, or at least fluctuating water levels, both of which have negative repercussions for *V. geyeri*. The species requires a stable microhabitat with saturated

soils; conditions that are no longer found at the site. The cause of the groundwater issues are uncertain and may include drainage or abstraction in the wider surrounding landscape or changes to the precipitation patterns caused by climate change. Another, likely related, pressure acting on the site is the encroachment of trees and scrub species, which is likely due to a lack of grazing pressure and drying out. Input of nutrients from the application of fertiliser to adjacent improved grassland is also likely to be affecting the site. A study of the hydrology of the site is required to elucidate the causes of the drying out/fluctuating water levels, while appropriate grazing and limited scrub removal is also required.

VgCAM21 – Ox Mountains

Overall assessment

The Population Assessment for Ox Mountains was Unfavourable-Inadequate (amber) due to the generally low numbers of snails recorded, while the Habitat Assessment was Favourable (green) due to the abundance of suitable habitat at the site. Future Prospects were assessed as Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Ox Mountains is Unfavourable-Inadequate (amber).

Site summary

The Ox Mountains *Vertigo geyeri* site continues to be a good site for the species, despite its small size. It has abundant suitable habitat within the runnel, with carpets of the brown mosses *Scorpidium cossonii*, *Scorpidium scorpioides* and *Campyllum stellatum*, along with *Carex lepidocarpa* and *Schoenus nigricans*. While the habitat for the snail is good, there does appear to be an on-going decline in the population of the snail across the last three monitoring periods, with the current survey being the first time the snail was not recorded from every sample location. There is no clear reason for this decline, as the habitat remains very good for the snail at all sample locations. The only real pressure acting on the site is grazing by sheep. While there were none on site at the time of the survey, droppings were noted. A windfarm continues to operate on the lands around the site; however, there is no sign that this is having an effect on the snail and its habitat. The only management recommendation put forward is to maintain, or slightly increase, the level of sheep grazing on the site.

VgCAM22 – Pollardstown Fen

Overall assessment

The Population and Habitat assessments returned a result of Unfavourable-Bad (red), as did the Future Prospects assessment. Based on these assessments, the Overall Assessment for Pollardstown Fen is Unfavourable-Bad (red).

Site summary

Pollardstown Fen is an important large fen site in which all three Annex II *Vertigo* species have been recorded in the past. However, *Vertigo geyeri* was not recorded during the current survey, which indicates a continuing decline since the 2007-2012 monitoring period when seven out of ten sample locations were positive for the snail. While the ground wetness, a critical factor for the survival of *V. geyeri*, was often suitable, the overall habitat tended to be tall and rank, which shades out the *Carex lepidocarpa* and brown moss sward required by the snail. This decline in habitat quality was noted along the transects and across the site in general. The lack of grazing is the main pressure acting on the site when it comes to the future survival of *V. geyeri*. The NPWS has introduced a programme of limited grazing by cattle in order to improve the conservation status of the site, but this has not yet been seen to benefit the snail. Sheep are considered to be the best grazer for *V. geyeri* habitat, as they maintain a low, open sward and cause lower poaching damage due to their small size. This is evidenced by the fact that the best habitat for the snail on the site is limited to a small sheep-grazed section of Polygon F in the east. Any expansion of grazing across the site will also have to take into account the other Annex II *Vertigo* species that are Qualifying Interests for the site, particularly *Vertigo moulinsiana* which is more dependent on tall, ungrazed vegetation. Changes to management at Pollardstown Fen will need to be closely monitored to ensure that they are achieving the desired outcome and to balance the needs of the various Qualifying Interests, both species and habitats.

VgCAM23 – Waterstown Lough

Overall assessment

The Overall Assessment for Waterstown Lough was assessed as Favourable (green) in the 2013-2018 monitoring period. Since then, the Population Assessment has dropped to Unfavourable-Inadequate (amber) and while the Habitat Assessment remains Favourable (green), in light of the population decrease and the pressures acting on the site, the Future Prospects are assessed as Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Waterstown Lough is Unfavourable-Inadequate (amber).

Site summary

Waterstown Lough is considered a particularly important site for *Vertigo* species, with all three Annex II species being recorded there during the 2013-2018 monitoring period. While *Vertigo angustior* was not recorded during the current survey, both *Vertigo geyeri* and *Vertigo moulinsiana* continue to be present on the site. The *V. geyeri* population has shown signs of decline, with only one sample being positive for the snail during the current survey, compared with three positive samples in 2013-2018. Suitable habitat continues to be found at the site; however, drying out appears to be an issue, with periodic flooding closer to the lake margins. The habitat is kept open by cattle grazing, though localised poaching is an issue and getting the balance between grazing levels and poaching is important when it comes to the future management. It may be possible to alter the timing of cattle access to the fen to alleviate the issue of poaching, while the infilling of the cattle drinking pond and the provision of water for cattle outside the fen would also be of benefit.

VgCAM24 – Duleek Commons

Overall assessment

The Population and Habitat assessments returned a result of Unfavourable-Bad (red), as did the Future Prospects assessment. Based on these assessments, the Overall Assessment for Duleek Commons is Unfavourable-Bad (red).

Site summary

During the 2013-2018 monitoring period, the site at Duleek Commons was noted to be drying out and *Vertigo geyeri* was only recorded from a single sample location, with one individual found. This drying out appears to have continued, with much of the previous fen/flush habitat drying out and converting to wet grassland. As a result, *V. geyeri* was not recorded from the site during the current survey. The cause of the drying out is unclear, but does not appear to be the result of pressures located within the site boundary, but rather a more regional issue. A drop in the groundwater level may be the result of agricultural abstraction on the surrounding farmland, or pumping from the five quarries located in reasonably close proximity to Duleek Commons. A detailed ecohydrological study would be required to find the cause of the drying out.

1.3 *Vertigo moulinsiana* site summaries

VmCAM01 – Borris

Overall assessment

Despite *Vertigo moulinsiana* being recorded at the site again during the current survey after an absence in 2013-2018, the Population Assessment remains Unfavourable-Bad (red) due to the low numbers and distribution. Vegetation and moisture levels are still good, but there has been some reduction in the extent of suitable vegetation along the transect, resulting in a Habitat Assessment of Unfavourable-Inadequate (amber), while current status of the site and its future trends based on the pressures acting on the site result in a Future Prospects Assessment of Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Borris is Unfavourable-Bad (red).

Site summary

Vertigo moulinsiana was once again recorded at Borris after an absence during the 2013-2018 monitoring period, lending weight to the suggestion that the site generally supports a low density population of the species. The best habitat is present along the back drain of the River Barrow towpath, tall swamp vegetation, particularly *Glyceria maxima*, providing good habitat for the snail. The site is affected by periodic flooding from the River Barrow with a 1-in-10 probability in any given year, though this is only likely to impact on *Vertigo moulinsiana* in exceptional years. Scrub encroachment in the form of *Salix cinerea* and *Alnus glutinosa* constitute the main pressure acting on the *Vertigo moulinsiana* habitat at the site and some sensitive active management is required to maintain the site for the species.

VmCAM02 – Fin Lough

Overall assessment

While *Vertigo moulinsiana* continues to be present in a number of locations at this site, its distribution and numbers have continued to drop since the 2007-2012 monitoring period resulting in a Population Assessment of Unfavourable-Bad (red). The wetness at the site remains good and, while there has been some localised loss of suitable vegetation, the habitat is generally still good for the species, giving a Favourable (green) Habitat Assessment. Based on the changes at the site and the identified pressures (clearly identified or otherwise), the Future Prospects have been classed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Fin Lough is Unfavourable-Bad (red).

Site summary

Fin Lough is an extensive site with a range of vegetation types capable of supporting *Vertigo moulinsiana* because it is an infilling lake offering a range of niches. Broadly, there is abundant suitable habitat for the snail in terms of the plant species present and the wetness, though there are localised impacts that have caused the virtual total loss of vegetation leaving only bare marl mud under shallow water. Despite the widespread suitable habitat, the *Vertigo moulinsiana* population at the site continues its decline from 75% positive in 2007-2012, to 53% positive in 2013-2018, to 38% in the current survey. It is possible that water quality has been impacted (which may also explain the vegetation loss), but there is limited evidence for this beyond some eutrophication in the adjacent pond. The continued presence of the snail at the site may depend on identifying the specific cause of the reduction in numbers and localised loss of vegetation. It may be that liaison with the adjacent landowners would shed some light on the situation.

VmCAM03 – Lough Owel

Overall assessment

Due to the Unfavourable-Bad (red) assessments for Population, Habitat, and Future Prospects the Overall Assessment for Lough Owel is Unfavourable-Bad (red).

Site summary

The *Vertigo moulinsiana* habitat at Lough Owel comprises fen areas on either side of the feeder canal, but has shown some signs of decline over the last two monitoring periods. Drying out has resulted in the loss of suitable habitat in the strip of land between the road and the canal (Polygon C) and has similarly reduced

habitat suitability in the area to the northeast (Polygon A). This reduction in suitability is reflected in the population distribution, with the snail completely lost from Polygon C and reduced in Polygons A and B. While extensive cattle grazing continues across much of Polygon B, the habitat here is still suitable, with abundant *Carex* species. Grazing appears to have ceased in Polygon A, which may be contributing to the habitat change that has seen much of the potentially suitable habitat become grassier and drier. Addressing the drying out may prove a challenge, as the canal water levels are currently well below the ground level and Lough Owel is a water supply for Mullingar, thus putting pressure on the water levels.

VmCAM04 – Mountmellick

Overall assessment

While *Vertigo moulinsiana* continues to be recorded at Mountmellick, there is a clear deterioration at the site in terms of population and habitat suitability. The population has shown a decline across the last three monitoring periods, dropping to Unfavourable-Bad (red) in 2013-2018 and showing a further decline since. The cover of suitable vegetation is declining, as is the extent of suitable ground wetness, which has resulted in a Habitat Assessment of Unfavourable-Bad (red). The pressures acting on the site are significant, as evidenced by the decline in population and habitat, and the Future Prospects are also considered Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Mountmellick is Unfavourable-Bad (red).

Site summary

The *Vertigo moulinsiana* site at Mountmellick is in clear decline, with the extent of suitable vegetation and wetness within the disused canal bed reducing from monitoring period to monitoring period. Succession and drying out were pressures identified by Moorkens & Killeen (2011) and Long & Brophy (2019) and these processes are continuing, with horse grazing also having an effect, apparently replacing earlier cattle access to the site. Stretches that were previously dominated by *Glyceria maxima* are now dominated by *Agrostis stolonifera*, with sparse or no *Glyceria maxima* present. Vegetation has been completely lost from the first 15m of the transect due to shading and drying out. The canal bed is fed by a spring from the east bank at approximately 85m on the transect, but this does not seem to be supplying enough water to keep the soil wetness levels optimal for *Vertigo moulinsiana*. The artificial nature of the site means that the natural processes that maintain other wetland sites are not functioning in this case and the current decline is likely to continue, with management actions likely to have limited effects.

VmCAM05 – Louisa Bridge

Overall assessment

Vertigo moulinsiana continues to be recorded at Louisa Bridge, though with fewer positive locations and at a lower density, resulting in a Population Assessment of Unfavourable-Bad (red). The Habitat Assessment is also Unfavourable-Bad (red) due to the reduced extent of suitable vegetation and soil wetness. Due to the current status and likely future trend at the site, and the pressures acting upon it, Future Prospects are assessed as Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Louisa Bridge is Unfavourable-Bad (red).

Site summary

Most of the Optimal habitat for *Vertigo moulinsiana* at Louisa Bridge can be found on the Rye Water flood plain at the base of the slope, though patches occur elsewhere in the site. The *V. moulinsiana* population appears to have reduced in extent within the site, with some areas dominated by unsuitable vegetation such as *Molinia caerulea* or too dry to provide suitable habitat for the snail. *Alnus glutinosa* saplings are springing up within some of the habitat polygons, while *Salix cinerea* is encroaching from the edges in places. The wetness is patchy across the site and slope-side springs continue to supply water to some areas. There is little needed in the way of management, beyond some sensitive removal of woody species spreading into the habitat, and protecting the site from external disturbance.

VmCAM06 – Ballybeg Lough

Overall assessment

The Population Assessment is Unfavourable-Bad (red), in contrast with the Habitat Assessment, which is Favourable (green). Considering these assessments, the trends and the existing threats and pressures, the Future Prospects were assessed as Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Ballybeg Lough is Unfavourable-Bad (red).

Site summary

Vertigo moulinsiana continues to occur across the site at Ballybeg Lough, though generally in low numbers. The numbers recorded along the transect do not approach those from the 2007-2012 monitoring survey, but are similar to those from 2013-2018. The habitat for the snail is still good, with a band of *Carex paniculata* tussocks running along the lake shore, with other *Carex* species also present along Transect 4. Most of Polygon B supports tall swamp vegetation dominated by *Cladium mariscus* and *Phragmites australis*, with the notable presence of *Typha angustifolia* (a species that is thinly distributed in Ireland). Threats and pressures relevant to the site include cattle and horse grazing, vehicle operation and a potential housing development. The site still supports the snail, albeit at reduced numbers, and there is abundant good habitat; however, careful management of the site is required to ensure its continued presence.

VmCAM08 – Cappankelly

Overall assessment

The Population Assessment for Cappankelly is Favourable (green) due to the number of positive samples and the density of *Vertigo moulinsiana*. The Habitat Assessment is also Favourable (green), with good vegetation and wetness. Due to the lack of significant threats or pressures, the Future Prospects are Favourable (green). Based on these assessments, the Overall Assessment for Cappankelly is Favourable (green).

Site summary

Despite its small size, Cappankelly continues to be an excellent site for *Vertigo moulinsiana* in terms of population and habitat. The snail is found in the fringing swamp vegetation around the western half of the small lake, which is regularly inundated by flooding from Lough Ree. The lake edge within Polygon A comprises floating scraw with swamp vegetation, which prevents this area from being completely flooded. Cattle have some access to the lake from the north and west, but this does not appear to be affecting the swamp vegetation. The transect habitat is protected by an electric fence, though there was no other evidence of cattle grazing in the adjacent fen habitat at the time of the current survey. There appears to be no need to alter the current management at the site in order to maintain its status.

VmCAM09 – Waterstown Lough

Overall assessment

Despite an improvement in the number of positive samples since the previous monitoring period, the Population Assessment remains Unfavourable-Bad (red). In contrast, the large extent of suitable vegetation with good soil wetness has resulted in a Habitat Assessment of Favourable (green). While the threats and pressures identified for the site do not appear to be having a significant impact on the snail's population, the distribution and density has not achieved 2007-2012 levels and the reason for this is unclear; however, the population has increased significantly since the last round of monitoring. For this reason, the Future Prospects were assessed as Favourable (green). Based on these assessments, the Overall Assessment for Waterstown Lough is Unfavourable-Bad (red).

Site summary

Historically, all three Annex II *Vertigo* species have been recorded from Waterstown Lough, with one positive location each recorded for *Vertigo geyeri* and *Vertigo angustior* in 2013-2018. For this reason, the site is important for the conservation of these species. *Vertigo moulinsiana* is quite widely distributed within the site. The snail is supported by tall fringing swamp vegetation and the adjacent fen area, with good wetness. The water levels of the lake were high at the time of survey, which likely helps to maintain the soil wetness for the species. The *Vertigo moulinsiana* population has improved slightly since 2013-2018, but it has not recovered to the numbers returned by the 2007-2012 survey, leading to a Population Assessment of Unfavourable-Bad (red). The cause of this reduction in the population is unclear, as extensive suitable habitat is present on the

site, and the pressures identified would not appear to be sufficient to cause this decline. Cattle grazing is the main activity occurring within the site, though this is limited to the eastern section and no major change of management is required.

VmCAM10 – Ballynafagh Lake

Overall assessment

The Population Assessment, Habitat Assessment and Future Prospects for Ballynafagh Lake were all Unfavourable-Bad (red). Based on these assessments, the Overall Assessment for Ballynafagh Lake is Unfavourable-Bad (red).

Site summary

The *Vertigo moulinsiana* site at Ballynafagh Lake is spread across four polygons, namely the lake itself, adjacent wetland to the southwest, and two stretches of the Blackwood Feeder. While the lake supports abundant suitable vegetation and wetness, the three other polygons have continued to deteriorate since the 2013-2018 monitoring period, with a reduction in suitable vegetation and/or soil wetness. The population of *V. moulinsiana* within the site has declined in all four polygons, resulting in an assessment of Unfavourable-Bad (red), as in 2013-2018. Even within the lake polygon, there has been some loss of suitable habitat, with the area in which Transect 1 was located now completely scrubbed over, leading to the loss of suitable vegetation. The Habitat Assessment and Future Prospects for the site are also Unfavourable-Bad (red).

VmCAM11 – Charleville Lake

Overall assessment

The Population Assessment, Habitat Assessment and Future Prospects for this site are all Favourable (green). Based on these assessment results, the Overall Assessment for Charleville Lake is Favourable (green).

Site summary

Charleville Lake supports a good population of *Vertigo moulinsiana* in the tall fringing vegetation around the lake and in areas of tall sedge understorey within the wet woodland to the east. With regard to the snail's population, the situation has been largely stable for the last three monitoring periods and this is likely to continue into the future. Maintaining the water levels in the lake and consequently appropriate wetness within the *V. moulinsiana* habitat is vital, and for this reason, the sluice controlling the outflowing stream located near the northwest corner of the lake needs to be maintained. There is a second, uncontrolled outflow along the southern side of the lake, which also needs to be considered in any hydrological assessment of the lake. The centre of the lake is vegetating over and while it is still very wet and quaking, it does indicate that the site is progressing along a path of succession, which in the long term is likely to reduce the suitability of part of the site for *V. moulinsiana*. Long & Brophy (2019) suggested that this succession is being accelerated by peat sedimentation from nearby peat extraction, based on information from local NPWS staff.

VmCAM12 – Curragh Chase

Overall assessment

Due to the absence of *Vertigo moulinsiana* from the fen area to the south, the Population Assessment for Curragh Chase is Unfavourable-Inadequate (amber). The abundance of suitable habitat fringing the lakes and the patches of suitable habitat in the fen, along with the lack of significant pressures, result in an assessment of Favourable (green) for Habitat Assessment and Future Prospects. Based on these assessments, the Overall Assessment for Curragh Chase is Unfavourable-Inadequate (amber).

Site summary

The fringing swamp vegetation of the lakes at Curragh Chase provides good habitat for *Vertigo moulinsiana* and supports a good population of the snail. The population has improved since the previous round of monitoring, at least around the lake, while the snail remains absent from the fen area to the south. The site remains Unfavourable-Inadequate (amber) for *V. moulinsiana*, as it was in 2013-2018; however, this is now only due to the Population Assessment, as the Habitat Assessment and Future Prospects are Favourable

(green). Cattle grazing in the fen area has reduced its suitability for the snail and liaison with the landowner would be required if this situation is to be improved. While there is no evidence of it affecting the *V. moulinsiana* population as yet, the increase in nutrient levels in the lake, illustrated by the presence of green algae, indicates that water quality is an issue and could have a negative effect in the future. Control of scrub around the lakes could also benefit the fringing swamp vegetation and, by association, *Vertigo moulinsiana*. Overall, Curragh Chase is a good site for *Vertigo moulinsiana* and the snail is likely to continue its presence here into the future.

VmCAM14 – Kildallan Bridge

Overall assessment

While the Habitat Assessment is Favourable (green), the limited distribution of *Vertigo moulinsiana* away from Transect 1 results in a Population Assessment of Unfavourable-Inadequate (amber), while the pressure cause by the maintenance of the canal results in a Future Prospects of Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Kildallan Bridge is Unfavourable-Inadequate (amber).

Sites summary

Kildallan Bridge supports a very good, if spatially limited, population of *Vertigo moulinsiana*. The Optimal habitat is limited to the swamp vegetation in the back-drain southeast of the canal bridge, while the wider site is Suboptimal-Unsuitable. The site would benefit from a reduction in the intensity of management of the vegetation fringing the Grand Canal, as this habitat is now low-growing and sparse, when it would be more suitable if it was allowed to grow tall, dense and develop a litter layer. Infilling has occurred just west of Polygon A and it must be ensured that further infilling does not occur. Given the limited area of optimal habitat at Kildallan Bridge, it is important that more suitable habitat be allowed to develop in the area to ensure the continued presence of *V. moulinsiana* at this site.

VmCAM16 – Lisduff Fen

Overall assessment

The population of *Vertigo moulinsiana* at Lisduff Fen continues to decline, resulting in a current Population Assessment of Unfavourable-Bad (red). This is despite the apparent suitability of the habitat at this site, with a Habitat Assessment of Favourable (green). Taking into account the on-going decline in the population and the pressures, Future Prospects were assessed as Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Lisduff Fen is Unfavourable-Bad (red).

Site summary

The site at Lisduff Fen continues to support a population of *Vertigo moulinsiana* at low density; however, it does appear that the progressive loss of the species from the southern half of the site is occurring. There is no clear reason for this loss, as the habitat appears suitable in terms of vegetation (*Schoenus nigricans* tussocks) and wetness. The only noted activity occurring at the site is grazing by cattle and a donkey, but the level of grazing appears to be suitable for the habitat and prevents the spread of scrub across the *V. moulinsiana* habitat. It may be that something is occurring in relation to the groundwater supply to the site and the effect is spreading; however, detailed hydrological monitoring would be required to uncover any such change. As well as *Vertigo moulinsiana*, the site continues to support Marsh Fritillary (*Euphydryas aurinia*), with webs on some of the higher ground within the fen with abundant *Succisa pratensis*. As the site is subject to effects from agricultural activities in the vicinity, it is important that the landowners are contacted and the importance of the site stressed, with recommendations made for the future management of the site.

VmCAM17 – The Murrough

Overall assessment

Despite an improvement in the *Vertigo moulinsiana* population since 2013-2018, the Population Assessment remains Unfavourable-Inadequate (amber). The Habitat Assessment and Future Prospects also remain Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for The Murrough is Unfavourable-Inadequate (amber).

Site summary

The Murrough remains an important site for *Vertigo moulinsiana* in Ireland, as the most easterly site for the species. The extensive wetland habitat provides abundant opportunities for the snail in the face of changing conditions, while the active management being undertaken by Birdwatch Ireland in clearing scrub, carrying out conservation grazing with Kerry ponies, and drain blocking, should benefit *V. moulinsiana* in the long term. The lands extending to the south of the road at Five Mile Point have some of the best *V. moulinsiana* habitat within the site, with abundant *Phragmites australis* and *Cladium mariscus* swamp. For this reason, the snail is likely to persist at this site into the future.

VmCAM18 – Pollardstown Fen

Overall assessment

With Unfavourable-Bad (red) assessments for population, habitat and Future Prospects, the Overall Assessment for Pollardstown Fen is Unfavourable-Bad (red).

Site summary

Pollardstown Fen is an important site for *Vertigo*, as it is designated for all three Annex II *Vertigo* species. However, the situation is not positive for any of the species, with *Vertigo geyeri* and *Vertigo angustior* only found at one sample location each in 2013-2018. *Vertigo moulinsiana* is faring better, but was still assessed as Unfavourable-Bad (red) for population in the current survey. The pressures acting on the site include drying out and a change to less suitable vegetation in places, with *Juncus subnodulosus* spreading. Some of the particularly dry areas have seen encroachment by *Rubus fruticosus* agg.

Pollardstown Fen had largely been abandoned from an agricultural management point of view, with only occasional grazing occurring in places, particularly in the southeast; however, NPWS is instigating a conservation grazing programme to address the loss of suitable habitat for *Vertigo geyeri* and *Vertigo angustior*, as well as to improve the condition of Annex I fen habitats. The monitoring and maintenance of water levels is even more critical to the continued presence of *V. moulinsiana* within the site, as the species depends on water levels that are generally at or above ground level. Given that the water levels are dependent on the mid-Kildare aquifer, activities, such as water abstraction, in the wider area outside the fen could impact on the habitat within the fen.

The decline of the population and habitat assessments in Pollardstown Fen suggest that the future presence of *V. moulinsiana* is under threat in the long-term.

VmCAM19 – Portumna

Overall assessment

Vertigo moulinsiana and suitable habitat for the species occur widely at Portumna, resulting in Favourable (green) assessments for population and habitat. Taking into account the current status in light of threats and pressures, Future Prospects have also been assessed as Favourable (green). Based on these assessments, the Overall Assessment for Portumna is Favourable (green).

Site summary

Portumna is an important site for *Vertigo moulinsiana* due to the widespread suitable habitat for the species and the generally stable water levels provided by Lough Derg, as it is artificially controlled by the ESB. The snail is found in various locations within Portumna Forest Park and where suitable habitat occurs along the east shore of the lake, and the population appears to be reasonably stable when compared with the 2013-2018 monitoring survey. There are few pressures acting on the *V. moulinsiana* population at Portumna, with grazing by cattle, horses and deer the main ones. Grazing pressure can be addressed by reducing access or numbers in the appropriate areas. Some of the habitat polygons within the forest park are being shaded by trees and would benefit from opening up the canopy. A potential threat exists in the form of the Water Supply Project – Eastern and Midlands Region, which proposes to abstract water from Lough Derg, though the fact that the lake levels are artificially maintained means this risk should be low. Overall, the population and habitat for *V. moulinsiana* at Portumna are good and stable, and should remain so into the future.

VmCAM21 – Royal Canal Longford Branch

Overall assessment

While the Favourable (green) Habitat Assessment indicated that there is abundant suitable habitat for *Vertigo moulinsiana* at this site, the decline in the population due to the pressure of succession returned Unfavourable-Inadequate (amber) results for Population Assessment and Future Prospects. Based on these assessments, the Overall Assessment for the Royal Canal, Longford Branch is Unfavourable-Inadequate (amber).

Site summary

The *Vertigo moulinsiana* habitat along the Royal Canal, Longford Branch is located within the canal bed of the disused canal channel. Extensive tall swamp vegetation occurs along the canal bed, with good wetness, with some stretches even supporting floating scraw over water depths >80cm. The population is still widespread along the site, but the species appears to have been lost from Polygon C. This is due to the main pressure acting on the site, which is shading out of swamp vegetation by the spread of *Salix cinerea* and *Alnus glutinosa* along the canal banks. This pressure is acting along other stretches of the canal, too, and management is required to reduce this pressure and restore the swamp vegetation. The Royal Canal, Longford Branch remains a good site for *V. moulinsiana* and could be returned to good condition reasonably easily with the introduction of the appropriate management works.

VmCAM23 – Castletown

Overall assessment

The Population Assessment for *Vertigo moulinsiana* at Castletown is Favourable (green), despite some notable decline. However, the Habitat Assessment returned a result of Unfavourable-Bad (red) due to drying out and loss of suitable vegetation, as did Future Prospects due to this loss of suitable habitat related to drainage of the area. Based on these assessments, the Overall Assessment of Castletown is Unfavourable-Bad (red).

Site summary

The *Vertigo moulinsiana* site at Castletown was first fully surveyed in 2012 by Long & Brophy (2013). At this time, the site had significant amounts of suitable vegetation, but was showing signs of decline due to drying out. During the 2013-2018 monitoring survey, this decline was clearly evident, with the loss of suitable vegetation underway and the cause being the major drains bordering the site. The drains have remained in place and so the drying out has continued into the current survey period. The decline in the site is evidenced by the gradual decline of the snail population along the transect and across most of Polygon B, though the habitat decline appears to be outpacing the population decline at the moment in terms of distribution, the abundance numbers are significantly down. Action will be required to re-wet the swamp area and attempt to re-establish the suitable vegetation, which used to include *Sparganium erectum*. This would entail the partial or complete blocking of the drains bordering the site.

VmCAM24 – Gollierstown

Overall assessment

As a new site, there are few data available on which to base the new assessment criteria. For this reason, and given the lack of apparent pressures, it is assumed that the site is in good condition. This has resulted in the Population Assessment, Habitat Assessment and Future Prospects being assigned Favourable (green) status. Based on these assessments, the Overall Assessment for Gollierstown is Favourable (green).

Site summary

Vertigo moulinsiana was first recorded at Gollierstown in 2018 (M. Long, pers. comm.) (though a historical record noted the species in the vicinity in 1945) and the current monitoring is the first time a full survey has been carried out at the site. The *V. moulinsiana* habitat comprises fringing vegetation, including *Sparganium erectum*, *Typha latifolia* and *Carex nigra*, around a flooded borrow pit. The pond is long-established and is visible on the 6-Inch map as part of a small quarry. Given the limited habitat available to the snail, the site is vulnerable to impacts including any significant change in water levels within the pond. No apparent pressures are acting on the site, though the future development of the Grand Canal Greenway poses a threat to *V. moulinsiana* and its habitat at Gollierstown.

VmCAM25 – Louisa Bridge (south)

Overall assessment

As a new site, there are few data available on which to base the new assessment criteria. Given the fact that the snail was recorded at all sample locations, it is assumed that the population is doing well, resulting in a Population Assessment of Favourable (green); however, the lack of soil wetness at most of the sample locations suggests the habitat is less than ideal, leading to a Habitat Assessment of Unfavourable-Inadequate (amber). Based on the current status of the site and the pressures acting on it, Future Prospects were also assessed as Unfavourable-Inadequate (amber). Based on these assessments, the Overall Assessment for Louisa Bridge (South) is Unfavourable-Inadequate (amber).

Site summary

Vertigo moulinsiana was first recorded at Louisa Bridge (South) in 2018 (M. Long, pers. comm.) and the current monitoring is the first time a full survey has been carried out at the site. The snail has also been recorded north of Louisa Bridge in the Rye Water river valley. The *V. moulinsiana* habitat comprises bank-drain swamp vegetation, dominated by *Carex acutiformis* and *Glyceria maxima*. Given the limited habitat available to the snail, the site is vulnerable to pressures, including the encroachment of scrub from all sides and drying out. The site would benefit from the sensitive removal of some of the encroaching scrub. The future development of the Grand Canal Greenway poses a threat to *V. moulinsiana* and its habitat at Louisa Bridge (South).

VmCAM26 – Loughmerans

Overall assessment

As a new site, there are few data available on which to base the new assessment criteria. For this reason, and given the lack of significant pressures, it is assumed that the site is in good condition. This has resulted in the Population Assessment, Habitat Assessment and Future Prospects being assigned Favourable (green) status. Based on these assessments, the Overall Assessment for Loughmerans is Favourable (green).

Site summary

Vertigo moulinsiana was first recorded at Loughmerans in 2018 (M. Long, pers. comm.) and the current monitoring is the first time a full survey has been carried out at the site. The site is in a depression surrounded by steeply sloping woodland and bounded by a quarry to the north and cattle pasture on all other sides. The *V. moulinsiana* habitat polygons differ in character, with the Polygon A in the east dominated by *Carex paniculata* tussocks and some *Sparganium erectum*, while Polygon B in the west is dominated by *Phragmites australis*, with occasional *Sparganium erectum* and *Equisetum fluviatile* around the margin. The two areas are separated by wet woodland that conforms to the Annex I habitat 91E0 Alluvial forests. Water levels were very high in Polygon B at the time of survey, and it is unknown if this is the normal situation, though the presence of *Lemna minor* suggests that this may be the case. These water levels on flooded scraw made access to the wider polygon difficult.

Appendix 2: Vertigo angustior site reports

Introduction

This Appendix to the main report on the *Vertigo* habitat and site monitoring project contains the individual reports for *Vertigo angustior* sites. These were generated from the Microsoft Access database that was produced as part of the Vertigo National Monitoring Project, 2021. Each site report provides the results from the current monitoring survey (2022-2024) and the previous monitoring surveys (2008-2010 and 2014-2017). 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 periods was not part of the current project and so may still be present within the site reports.