

# Bryophyte survey of Roundton Hill



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Vegetation Survey and Assessment Ltd

Report No: 001

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Report series: 'Natur am Byth!' Evidence Report Series  
Report number: 001  
Publication date: April 2022  
Contract number:  
Contractor: Vegetation Survey and Assessment Ltd  
Contract Manager: Sam Bosanquet  
Title: **Bryophyte survey of Roundton Hill**  
Author(s): S.L. Pilkington  
Technical Editor: Isobelle Griffith  
Quality assurance: Level 2  
Peer Reviewer(s): Sam Bosanquet  
Approved by: John Clark  
Series editor(s):  
Restrictions: none

### **Distribution List (Electronic Only)**

NRW Library, Bangor  
National Library of Wales  
British Library  
Welsh Government Library  
Montgomeryshire Wildlife Trust  
Plantlife  
NRW North Powys Environment Team

### **Recommended citation for this volume:**

**Pilkington S.L. 2022. Bryophyte survey of Roundton Hill.** Natur am Byth! Report No: 001, 31 pp, Natural Resources Wales, Bangor.

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## 1. Crynodeb Gweithredol

Mae arolwg o Roundton Hill yn diweddarar' wybodaeth sylfaenol am ehangder a dosbarthiad dau o fwsoglau sydd wedi'u nodi Adran 7 Deddf yr Amgylchedd (Cymru) – sef *Tortula canescens* a *Weissia levieri* – a phedwar bryoffyt sy'n Brin yn Genedlaethol neu'n Anghyffredin yn Genedlaethol.

Canfuwyd bod pob un o'r chwe rhywogaeth wedi'u cyfyngu i lecynnau creigiog agored, tir ysbeiliog yn sgil mwyngloddio, a thir lle mae'r pridd yn denau mewn un ardal gymharol fach ar fryn sy'n wynebu'r de. Canfuwyd llawer o *Weissia levieri* - llawer mwy nag a dybiwyd yn flaenorol. Roedd llawer llai o *Tortula canescens* a'r pedair rhywogaeth arall. Gosodwyd marciau dros dro yn agos at y rhain i dynnu sylw at y cynefin mwyaf sensitif. Mae prysgwydd yn bygwth pob un o'r chwe rhywogaeth, bydd yn tresmasu'n fuan neu mewn ychydig flynyddoedd o leiaf, ac mae argymhellion wedi'u gwneud i dargedu hyn a'i reoli.

## 2. Executive Summary

A survey of Roundton Hill updates baseline knowledge of the population size and distribution of two Environment (Wales) Act Section 7 mosses – *Tortula canescens* and *Weissia levieri* – and four other Nationally Rare or Nationally Scarce bryophytes.

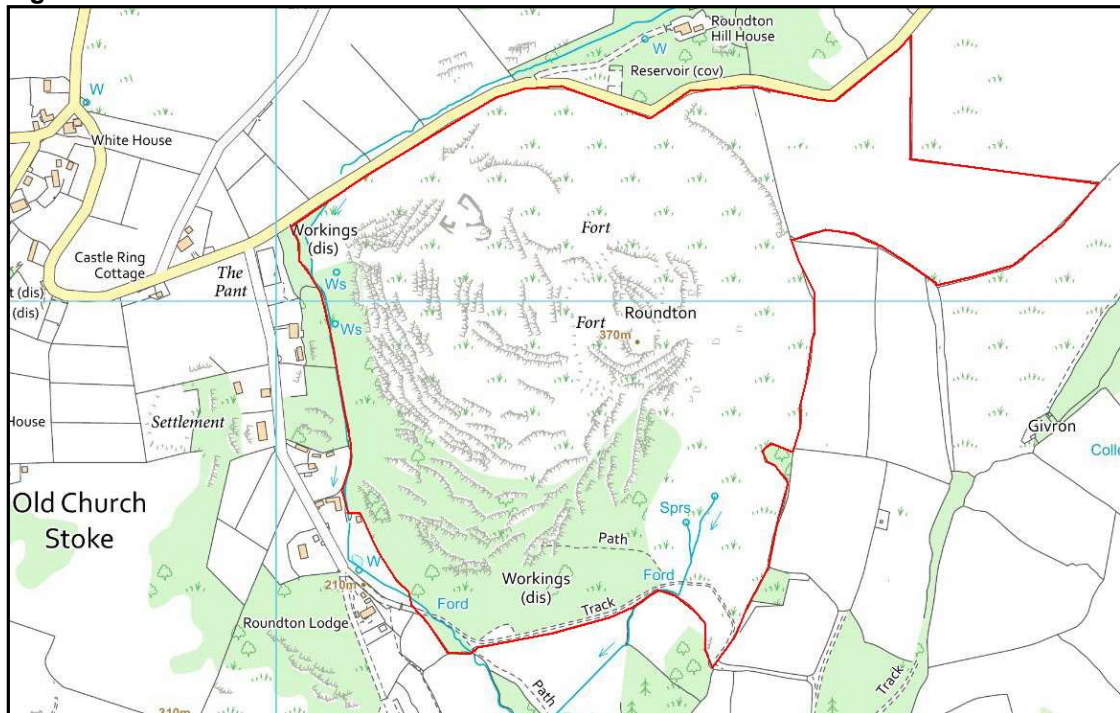
All six species were found to be restricted to rock exposures, mine spoil and thin soil in one relatively small area on the south-facing flank of the hill. *Weissia levieri* was found to be locally frequent, in a population that was significantly larger and more extensive than previously thought. *Tortula canescens* and the four other species occurred in much smaller numbers. Temporary markers were placed close to these colonies to highlight the most sensitive habitat. Scrub encroachment threatens all six species, imminently or in a few years, and recommendations for targeted management have been made to address this.



### 3. Introduction

Roundton Hill Site of Special Scientific Interest (SSSI) and National Nature Reserve (Figure 1) is a small, steep-sided hill located close to the village of Churchstoke in the Welsh Marches (Powys). It lies between 200 and 370m altitude, with its summit at Ordnance Survey National Grid Reference SO293950. Its geology is relatively complex; volcanic andesite, lava and tuff dominate its slopes, giving way to shale lower down, at a geological boundary marked by a few springs.

**Figure 1. Location of Roundton Hill SSSI**



The hill has numerous rock exposures, and its thin, dry soils are summer-parched on its southern aspect. Crucially, some of these are basic in character, and support a number of calcicolous mosses that would normally be very unlikely on igneous rock. Historically, miners worked the hill for lead and barites and a steep scree slope (mine spoil) is a prominent physical feature of the lower southern flank.

The hill was notified as a SSSI in 1986 primarily for its outstanding acid grassland which supports spring ephemerals of xerophytic conditions and for its diversity of lichen species.

It has long been known to support *Tortula canescens* – a nationally rare and declining moss which also appears on the NERC Act Section 42 list and its successor the Environment (Wales) Act Section 7 list. Various other notable bryophytes have been found at Roundton Hill, and its importance increased considerably in 2018 when the *Weissia sterilis* recorded from the hill in 1975 – then thought to be the only Welsh colony of that species – was redetermined as *W. levieri*, an even rarer species that, like *T. canescens*, is Section 7 listed.

The only other known British populations of *W. levieri* are on Carboniferous limestone on the coasts of north Somerset and the Gower Peninsula in Wales.

A visit to the hill by Sam Bosanquet (Natural Resources Wales) in April 2018 confirmed the presence of populations of *W. levieri* and *T. canescens* in an area where scrub clearance is urgently needed to conserve the open habitat of both species.

Other Nationally Rare (NR) and Nationally Scarce (NS) bryophytes previously recorded at Roundton Hill include *Bryum elegans* (NS), *Schistidium confertum* (NR) and *S. pruinosum* (NS). The hill also supports a number of other locally rare and uncommon species. Bosanquet (2018) describes the bryological significance of Roundton Hill in much more detail.

## 4. Approach

### 4.1. Objectives

Sharon Pilkington of Vegetation Survey and Assessment Ltd was commissioned by Natural Resources Wales to survey the bryophytes of Roundton Hill SSSI in order to determine the current extent of the populations of *T. canescens* and *W. levieri* and to allow individual colonies of both species – and any others of high conservation importance – to be marked to avoid accidental damage during scrub clearance.

### 4.2. Desk study

Baseline information about the historical distribution of bryophytes at Roundton Hill was primarily based on the detailed and recent account by Bosanquet (2018). However, records of all bryophyte taxa from the two Ordnance Survey monads in which the hill sits were obtained from the British Bryological Society's database to ensure that no other important records were omitted when choosing where to concentrate fieldwork searches. This search did not, however, yield any additional important data.

### 4.3. Field Survey

Roundton Hill was surveyed in mainly dry weather conditions on 15th – 17th March 2022. Fieldwork was primarily undertaken by Sharon Pilkington on 15th and 16th March, with help from Sam Bosanquet on 17th March. Survey work concentrated on parts of the hill where *T. canescens*, *W. levieri* and other rare bryophytes had previously been reported on mine spoil, sheltered rocks and disturbed ground in the vicinity of a disused mine adit on the southern flank of the hill. A search of other parts of the hill for other base-rich habitat or other vegetation, rock exposures or ecological features with potential to support notable bryophytes was also undertaken.

A hand-held navigational unit (Garmin model GPSMAP 64S) was used to record all discrete colonies of the two Section 7 species and other bryophytes of high conservation importance to 1m resolution. This navigational data was subsequently imported as a layer into Quantum GIS software (QGIS Development Team, 2022) and used to create report figures.

When colonies of *T. canescens* and *W. levieri* were found, a bamboo cane with pink ribbon or red tape tied to the top was pushed firmly into the ground as close to the location as possible, to highlight habitat where particular caution will be needed during any form of scrub clearance or other vegetation management. 19 such markers were emplaced in the course of the work, some in the open and others in dense scrub. Canes were also used to mark populations or discrete colonies of other species of note.

#### 4.4. Limitations

Dry weather on the first day of fieldwork made it quite challenging to find target species and it is possible that some small plants may have been overlooked. Likewise, it was not practicable to survey within all of the dense thorn scrub within the fenced-off mine spoil, although it transpired that *W. levieri* did grow within the scrub. What is hopefully a reasonable assumption about the distribution of *W. levieri* has therefore been made to inform habitat management approaches.

## 5. Results

Populations of *T. canescens* and *W. levieri* were successfully refound on the south-facing slope of the hill. Other NR and NS bryophytes also found included *Bryum elegans*, *B. kunzei*, *Schistidium confertum* and *S. pruinosum*, all on the southern slope between approximately 240 and 270m altitude, an area coincident with rocks and soils derived from base-rich dolerite. An assessment of each species' population size, distribution on Roundton Hill, ecological situation and threats is given in the following sections.

Figure 2 shows the distribution of the notable bryophytes. Appendix I lists all records of these species, and others recorded incidentally at Roundton Hill in the course of the fieldwork. This dataset has been submitted to the database of the British Bryological Society and is available in Excel spreadsheet format to any other interested and relevant parties.

### 5.1. *Tortula canescens*

Three small discrete colonies of *T. canescens* (15-20 plants in total, with mature sporophytes) were found steep south-facing mine spoil. They all showed a preference for skeletal soils within crevices among the spoil (Photo 1).

This moss requires a warm, sheltered microhabitat where it has negligible competition from other species. However, it grows within loose spoil that is easily dislodged and so is very vulnerable to gross disturbance. This should be borne in mind when scrub clearance in this part of the slope is carried out. Whilst it does not appear to be imminently threatened by scrub, maintenance of the open habitat it grows in is vital to safeguard the future of the species at Roundton Hill. As *T. canescens* is a short-lived vernal specialist that disperses by spores it undoubtedly moves around from year to year to take advantage of new microhabitat openings.

Figure 2. Distribution of notable bryophytes

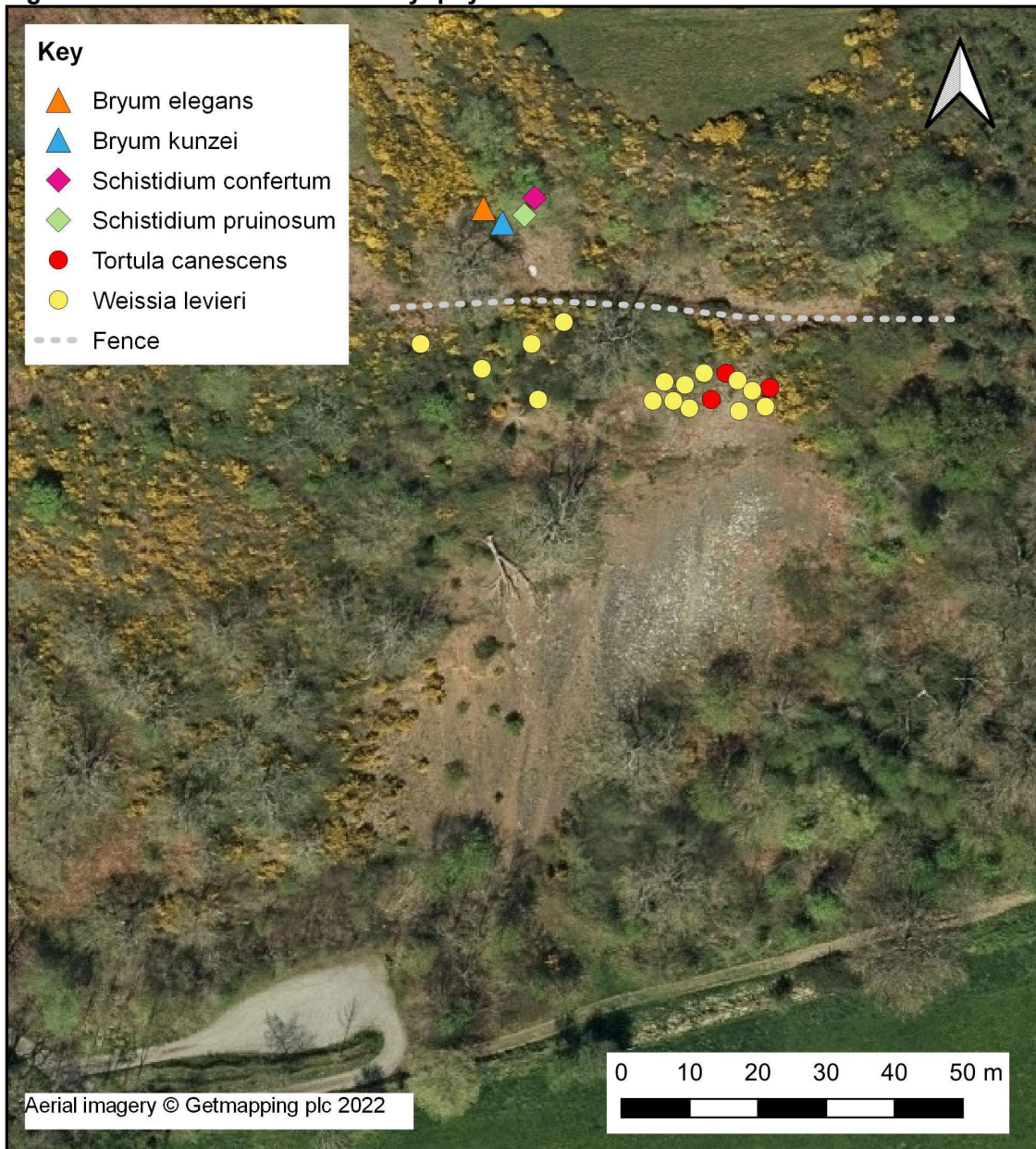




Photo 1: Microhabitat of *T. canescens* in mine spoil

## 5.2. *Weissia levieri*

A substantial and healthy-looking population of *W. levieri* (Photo 2) was found in the same area as 2018 but over a wider area. Because individual cushions often coalesced, it was impossible to make a definitive count, but the total population size was estimated to be in the low hundreds. The majority of plants grew on thin dry, base-rich soil in the mine spoil enclosure in a narrow zone between the lower edge of dense thorn scrub dominated by Hawthorn *Crataegus monogyna*, Gorse *Ulex europaeus* and Broom *Cytisus scoparius* into more open spoil with scattered scrub 10-15m downslope, in the same area as the population of *T. canescens* (Photos 3 and 4). Associates included other calcicolous bryophytes, especially *Homalothecium lutescens*, *Barbula unguiculata* and *Aloina aloides* and various higher plants including Wood Sage *Teucrium scorodonia*, sparse Bracken *Pteridium aquilinum* and low adventitious stems of Bramble *Rubus fruticosus* agg.

Most of the population occupies a rare microhabitat on Roundton Hill, in a dynamic transition between scrub and open sunny doleritic spoil, affording open, warm and sheltered conditions. When managing this area, a balance will need to be struck between scrub clearance and maintenance of some low-growing vascular vegetation.

Unexpectedly, the population of *W. levieri* was found to extend well into a bank of dense thorn scrub which occupies the top of the mine spoil enclosure. Many cushions (also with sporophytes) were found on steeply sloping ground below the scrub, mainly in mammal tracks made by rabbits, which probably act as

vectors of dispersal, in the enclosure. Because of the impenetrable nature of the scrub, a full survey was not undertaken here but it would be reasonable to expect *W. levieri* to be distributed throughout where the soils are basic.



**Photo 2: *Weissia levieri* with near-mature capsules**





Photo 3: Markers indicate the main area of distribution of *T. canescens* and *W. levieri*



Photo 4: Xeric open mine spoil habitat of *W. levieri*, with colony markers

### 5.3. Other Nationally Rare and Scarce Species

Very small populations of four other nationally restricted mosses were found just above the fenced mine spoil enclosure on and around south-facing rock outcrops (Photo 5). Frequent *H. lutescens* and the uncommon *Nogopterium gracile* indicate that basic rocks and soils are present in this area too.



Photo 5: Bryophyte-rich habitat of south-facing rocks / soil-covered ledges

#### 5.3.1. *Bryum elegans*

*Bryum elegans* is a rare moss of base-rich places in the uplands. It has been known from Roundton Hill since the British Bryological Society visited in 1975 and it was located in the current survey on thin dry soil over rocks (Photo 6). Only a few small shoots were found but it is an inconspicuous species and may well grow elsewhere. The population does not appear to be threatened as long as the habitat remains open and disturbed by livestock and/or rabbits.

#### 5.3.2. *Bryum kunzei*

*Bryum kunzei* grows in similar habitat to *B. elegans* but it is more of a lowland species, and it is unusual for the two species to grow together. Two small tufts of *B. kunzei* were found close to each other very close to *B. elegans* and in the same microhabitat (Photo 6). Whilst vulnerable to natural erosion or being dislodged by an animal, it was not considered to be threatened by imminent scrub invasion.



Photo 6: Habitat of *Bryum elegans* and *B. kunzei*

#### 5.3.3. *Schistidium confertum*

*Schistidium confertum* (Photo 7) was also discovered on the hill in the BBS field meeting in 1975. It has not been reported in the intervening period and therefore it is gratifying to know that it persists there. Several small cushions with mature sporophytes were found on the upper faces of two rocks close to each other on sloping ground but as it is a very small and inconspicuous species, more plants may occur in similar habitat nearby. A bank of dense scrub a few metres from the population may give it some shelter from wind etc., but the plants are vulnerable to further spread of scrub into the open habitat they need.

#### 5.3.4. *Schistidium pruinatum*

A cushion of *Schistidium pruinatum* was found on a south-facing rock exposure sheltered by nearby scrub very close to the population of *S. confertum*. It was not considered to be at imminent risk from scrub invasion or any other significant threat but scrub clearance in the immediate area would maintain its open habitat going forward.



Photo 7: *Schistidium confertum*

## 6. Conclusions

The current work confirms that Roundton Hill SSSI is an exceptional site for bryophytes, supporting a more substantial population of *W. levieri* than previously known and retaining a small population of *T. canescens*.

The four other nationally restricted mosses survive as small populations on the same south-facing slope but on open rock outcrops and thin parched soils above the mine spoil enclosure where the open character of the habitat appears to be maintained by rabbits and livestock. Dense scrub is present on low crags and rock exposures above the adit and is likely to play a role in creating a sheltered microhabitat for the rare bryophytes below. However, the area would benefit from some scrub control in the near future.

The highly restricted distribution of all the rare bryophytes on Roundton Hill cannot be over-emphasised; no populations were found anywhere else on the hill, and no other areas of base-rich ground or rocks (as potential habitat for these species) were identified in this assessment. It is therefore imperative that scrub control efforts should be directed at restoring and maintaining the open nature of the base-rich substrates where these species are found.

## 7. Management Recommendations

Dense scrub and secondary woodland already cover much of the lower slopes of Roundton Hill and it is clear that, if left unchecked, scrub will continue its expansion into the valuable open habitats supporting the rare bryophytes. This is a significant threat to the populations of the two Section 7 mosses that are found there.

However, the populations of *W. levieri* and *T. canescens* are highly sensitive to disturbance and in the open habitat where markers have been erected below the scrub bank, a light touch will be needed to manage developing scrub. In these areas, existing bushes (mainly Hawthorn) and tree saplings should be cut down by hand and treated to prevent regrowth. Adventitious Bramble should be cut back by hand / weed-wiped to prevent it spreading. This work should be carried out between June and September to avoid the active growth period of the two mosses and overseen by a bryologist/ecologist conversant with the sensitive nature of the work. Brash generated by the management work should be left nearby (ideally rolled downslope from the populations of interest to allow access from the top for future monitoring).

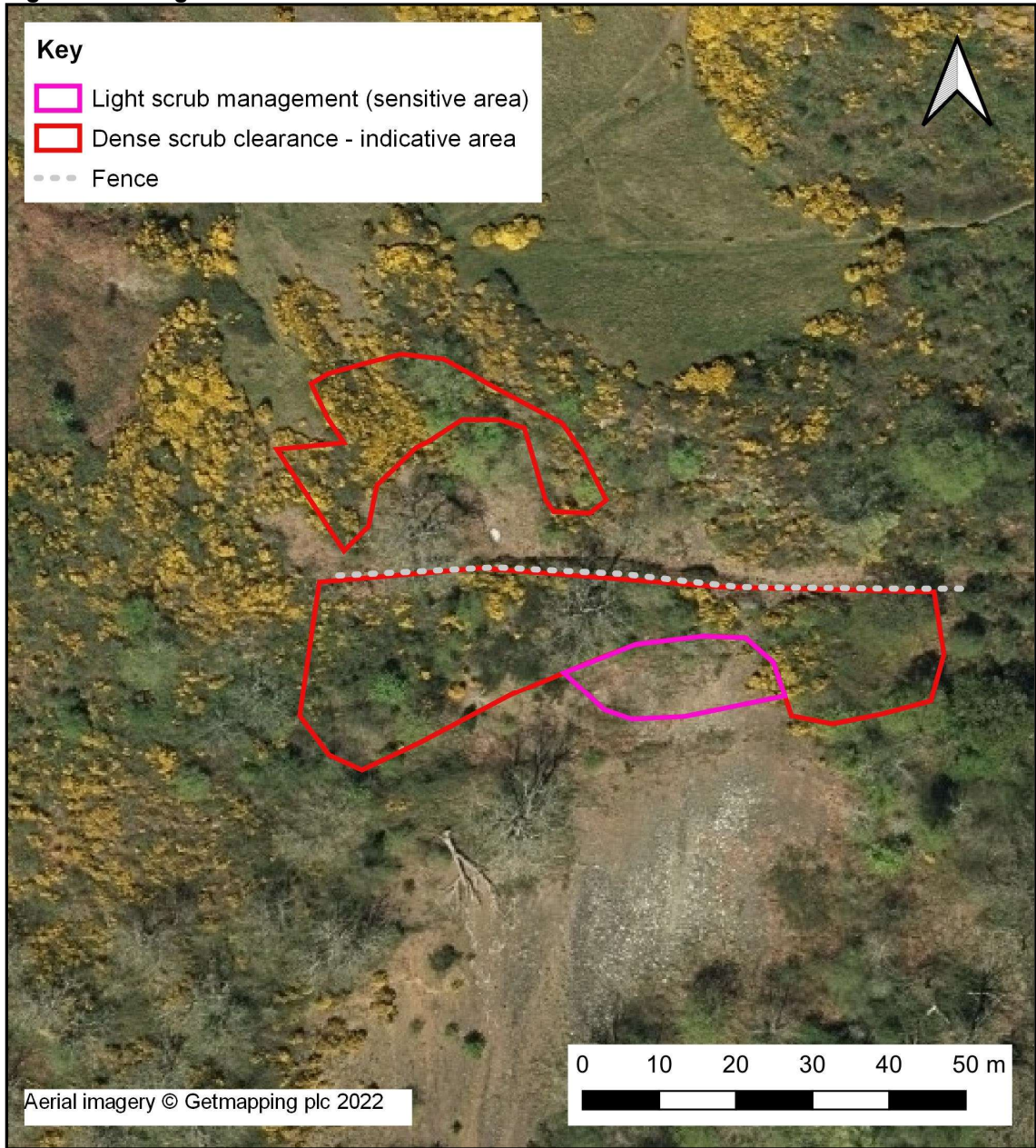
Dense thickets of scrub which are already obscuring other areas of base-rich south-facing ground, or which are likely to advance into such areas in the future also require clearance. A suitable area of poor-quality vegetation where brash and arisings from the clearance can be burnt should be agreed with NRW prior to work commencing.

This scrub clearance should be undertaken in three phases as follows, in the approximate locations indicated in Figure 3:

1. dense scrub within the fenced enclosure between the main populations of *W. levieri* and *T. canescens* and a large oak tree to the east;
2. dense scrub above the fenced enclosure between the habitat supporting the other four bryophytes of note and south-facing acid grassland and crags above; and
3. mature scrub in the fenced enclosure west of the open habitat supporting the populations of *W. levieri* and *T. canescens* and the enclosure fence;

It is recommended that some scrub is retained at the edges of the enclosure and above to (i) continue to afford some shelter to the bryophytes and (ii) provide cover to the rabbit population, which is likely to play a significant role in maintaining open ground and dispersing *W. levieri*. Impacts on the colonies of *W. levieri* which grow in the dense scrub are inevitable during the scrub clearance but are likely to be mitigated longer-term by the availability of more open habitat.

**Figure 3. Management works**



## 8. References

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## 9. Appendices

The Appendices have been removed to comply with Accessibility legislation because they comprise complex multi-entry data tables with numerous blanks cells and/or photographs for use during on-site monitoring. They are available in full from the NRW Library.

## Data Archive Appendix

Data outputs associated with this project are archived on server-based storage at Natural Resources Wales.

The final report in Microsoft Word and Adobe PDF formats.

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue <https://libcat.naturalresources.wales> (English Version) and <https://catllyfr.cyfoethnaturiol.cymru> (Welsh Version) by searching 'Dataset Titles'.



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**Natural  
Resources**  
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Published by:  
Natural Resources Wales  
Maes y Ffynnon  
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