

Appendix A.8.21

Lackagh Quarry Petrifying Spring Survey Results

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Lackagh Quarry Petrifying Spring Survey

The results of the Petrifying spring survey at Lackagh Quarry are presented below in **Table 1** and are followed by a brief discussion. The locations of the seepage lines are shown on **Plate 1** below and on **Figures 8.14.1 to 8.14.14** (Fossitt (2000) classification) and **Figures 8.15.1 to 8.15.14** (Annex I habitats).

Plate 1: Seepage lines recorded in Lackagh Quarry (including reference codes used in Table 1)

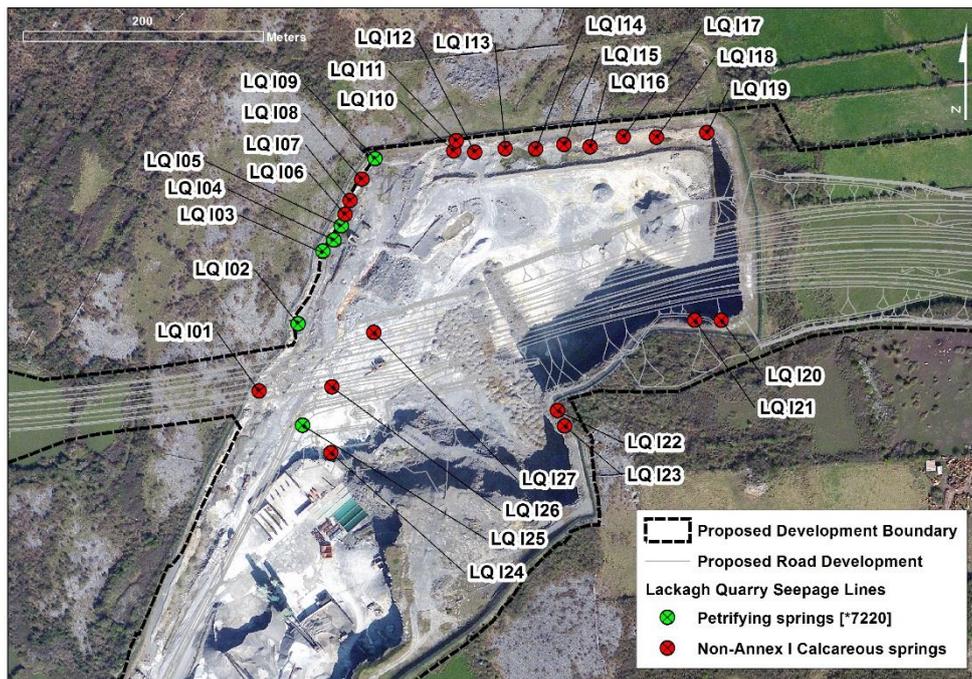


Table 1: Results of the Petrifying spring [*7220] survey at Lackagh Quarry¹

Ref. No.	Species ²	Comment
LQ I01	<i>Bryum dichotomum</i> , <i>Carex flacca</i> , <i>Centaurea nigra</i> , <i>Dactylis glomerata</i> , <i>Dicranella varia</i> , <i>Festuca rubra</i> , <i>Fissidens adianthoides</i> , <i>Geranium robertianum</i> , <i>Hieracium sp.</i> , <i>Leontodon hispidus</i> , <i>Leucanthemum vulgare</i> , <i>Linum catharticum</i> , <i>Polygala vulgaris</i> , <i>Prunella vulgaris</i> , <i>Rubus fruticosus agg.</i> , <i>Scrophularia nodosa</i> , <i>Sesleria caerulea</i> , <i>Sonchus oleraceus</i> , <i>Teucrium scorodonia</i> , <i>Tortella tortuosa</i> , <i>Trichostomum brachydontium</i> , <i>Tussilago farfara</i> , <i>Weissia controversa</i>	Although this seepage is relatively species rich, there are few species present that act as indicators of petrifying tufa springs. There is also no tufa present, with the calcareous material that has been deposited taking the form of calcareous mud, rather than tufa. Therefore, this seepage does not correspond to the EU Annex I habitat 7220 petrifying tufa spring.
LQ I02	<i>Bryum sp.</i> , <i>Campylium stellatum</i> , <i>Dactylis glomerata</i> , <i>Didymodon tophaceus</i> , <i>Encalypta streptocarpa</i> , <i>Epilobium parviflorum</i> , <i>Fissidens adianthoides</i> , <i>Geranium robertianum</i> , <i>Hieracium sp.</i> , <i>Leucanthemum vulgare</i> , <i>Pellia endiviifolia</i> , <i>Sesleria caerulea</i> , <i>Sonchus oleraceus</i> , <i>Tortella tortuosa</i> , <i>Tussilago farfara</i> , <i>Weissia controversa</i> .	Four species listed as indicative of [7220] habitat by NPWS (2013) and Lyons & Kelly (2016), but not according to CEC (2013), <i>Campylium stellatum</i> , <i>Fissidens adianthoides</i> , <i>Didymodon tophaceus</i> and <i>Pellia endiviifolia</i> , are present in this seepage, and tufa is forming, primarily amongst and between cushions of <i>D. tophaceus</i> , over a limited area. However, there are no other indicative species of tufa springs present, and tufa is only present over a small area. It is likely that, over time, this tufa would continue to accumulate, and become more extensive, and other species indicative of tufa, such as <i>Palustriella spp.</i> and <i>Eucladium verticillatum</i> may colonise this spring. A small area of this seepage could be classified as corresponding to the Annex habitat 7220, although at present it is a marginal example of the habitat, representing a recent colonisation of an artificially created quarry face.

¹ Seepage lines which correspond with the [*7220] Annex I habitat type are highlighted in green

² Indicator species (after NPWS, 2013) for the Annex I habitat *Petrifying springs with tufa formation (*Cratoneurion*) [7220] are highlighted in **bold** font.

LQ I03	<p><i>Brachypodium sylvaticum</i>, <i>Carex flacca</i>, <i>Carlina vulgaris</i>, <i>Cymbalaria muralis</i>, <i>Dactylis glomerata</i>, <i>Didymodon tophaceus</i>, <i>Festuca rubra</i>, <i>Fissidens adianthoides</i>, <i>Hypericum pulchrum</i>, <i>Juncus acutifolius</i>, <i>Leontodon hispidus</i>, <i>Leucanthemum vulgare</i>, <i>Linum catharticum</i>, <i>Pellia endiviifolia</i>, <i>Plantago lanceolata</i>, <i>Polygala vulgaris</i>, <i>Sesleria caerulea</i>, <i>Solidago virgaurea</i>, <i>Weissia controversa</i>.</p>	<p>Four species listed as indicative of [7220] habitat by NPWS (2013) and Lyons & Kelly (2016), but not according to CEC (2013), <i>Didymodon tophaceus</i>, <i>Pellia endiviifolia</i>, <i>Fissidens adianthoides</i> and <i>Festuca rubra</i>, are present in this seepage, and tufa is forming, primarily amongst and between cushions of <i>D. tophaceus</i>, over a limited area. However, the layer of tufa generally has little vegetation growing upon it, and a vegetation community is not well developed on the tufa. It is likely that, over time, this tufa would continue to accumulate, and become more extensive, and other species indicative of tufa, such as <i>Palustriella spp.</i> and <i>Eucladium verticillatum</i> may colonise this spring. Part of this seepage could be classified as corresponding to the Annex habitat 7220, although at present it is a marginal example of the habitat, representing a recent colonisation of an artificially created quarry face.</p>
LQ I04	<p><i>Blackstonia perfoliata</i>, <i>Carex flacca</i>, <i>Dicranella varia</i>, <i>Didymodon tophaceus</i>, <i>Epilobium parviflorum</i>, <i>Festuca rubra</i>, <i>Fissidens adianthoides</i>, <i>Hieracium sp.</i>, <i>Leontodon hispidus</i>, <i>Pellia endiviifolia</i>, <i>Sesleria caerulea</i>, <i>Sonchus oleraceus</i>, <i>Tussilago farfara</i></p>	<p>Four species listed as indicative of [7220] habitat by NPWS (2013) and Lyons & Kelly (2016), but not according to CEC (2013), <i>Didymodon tophaceus</i>, <i>Fissidens adianthoides</i>, <i>Pellia endiviifolia</i> and <i>Festuca rubra</i>, are present in this seepage, and tufa is forming, both amongst and between cushions of <i>D. tophaceus</i>, and as a thin layer covering the wet rock face down which water seeps. However, the layer of tufa generally has little vegetation growing upon it, and a vegetation community is not well developed on the tufa. It is likely that, over time, this tufa would continue to accumulate, and become more extensive, and other species indicative of tufa, such as <i>Palustriella spp.</i> and <i>Eucladium verticillatum</i> may colonise this spring. Part of this seepage could be classified as corresponding to the Annex habitat 7220, although at present it is a marginal example of the habitat, representing a recent colonisation of an artificially created quarry face.</p>

LQ I05	<i>Briza media</i> , <i>Carex flacca</i> , <i>Carex panicea</i> , <i>Dicranella varia</i> , <i>Didymodon tophaceus</i> , <i>Festuca rubra</i> , <i>Fissidens adianthoides</i> , <i>Leontodon hispidus</i> , <i>Lotus uliginosus</i> , <i>Pellia endiviifolia</i> , <i>Polygala vulgaris</i> , <i>Sesleria caerulea</i> , <i>Sonchus oleraceus</i> , <i>Tussilago farfara</i> .	Five species listed as indicative of [7220] habitat by NPWS (2013) and Lyons & Kelly (2016), but not according to CEC (2013), <i>Didymodon tophaceus</i> , <i>Fissidens adianthoides</i> , <i>Pellia endiviifolia</i> , <i>Carex panicea</i> and <i>Festuca rubra</i> , are present in this seepage, and tufa is forming, both amongst and between cushions of <i>D. tophaceus</i> , and as a thin layer covering an extensive area of the wet rock face down which water seeps. However, the layer of tufa generally has little vegetation growing upon it, and a vegetation community is not well developed on the tufa. It is likely that, over time, this tufa would continue to accumulate, and become more extensive, and other species indicative of tufa, such as <i>Palustriella spp.</i> and <i>Eucladium verticillatum</i> may colonise this spring. Part of this seepage could be classified as corresponding to the Annex habitat 7220, although at present it is a marginal example of the habitat, representing a recent colonisation of an artificially created quarry face.
LQ I06	<i>Carex flacca</i> , <i>Dicranella varia</i> , <i>Equisetum pratense</i> , <i>Festuca rubra</i> , <i>Holcus lanatus</i> , <i>Lotus uliginosus</i> , <i>Pellia endiviifolia</i> , <i>Polygala vulgaris</i> , <i>Rubus fruticosus agg.</i> , <i>Senecio jacobaea</i> , <i>Taraxacum officinalis</i> , <i>Tussilago farfara</i> .	Two characteristic species of Petrifying springs in Ireland, <i>Festuca rubra</i> and <i>Pellia endiviifolia</i> , were recorded from this seepage, but were not growing in association with tufa. Calcareous deposits were present on the rock face, but no species were growing in association with this. Therefore, this seepage does not currently support Annex I Petrifying spring habitat.
LQ I07	<i>Blackstonia perfoliata</i> , <i>Brachypodium sylvaticum</i> , <i>Carex flacca</i> , <i>Dicranella varia</i> , <i>Didymodon tophaceus</i> , <i>Epilobium parviflorum</i> , <i>Equisetum pratense</i> , <i>Festuca rubra</i> , <i>Geranium robertianum</i> , <i>Hypericum pulchrum</i> , <i>Leontodon hispidus</i> , <i>Pellia endiviifolia</i> , <i>Senecio jacobaea</i> , <i>Taraxacum officinalis</i> , <i>Tussilago farfara</i> .	Three indicator species of Petrifying springs in Ireland are present in this seepage, but were not growing in association with tufa. A film of calcareous material has formed on the rock surface in places, with some tufaceous material present, but no plant species grow upon this. Therefore, this seepage does not correspond to the Annex I Petrifying spring habitat.

LQ I08	<i>Carex flacca</i> , <i>Dactylis glomerata</i> , <i>Dicranella varia</i> , <i>Didymodon tophaceus</i> , <i>Epilobium parviflorum</i> , <i>Fissidens adianthoides</i> , <i>Hypericum pulchrum</i> , <i>Juncus acutiflorus</i> , <i>Leontodon hispidus</i> , <i>Pellia endiviifolia</i> , <i>Pohlia melanodon</i> , <i>Tussilago farfara</i> .	Deposits of calcareous material are present on the rock face in this seepage, and three indicative species of Petrifying springs are present. However, these indicative species are not associated with the calcareous depositions, and no vegetation is present upon the calcareous depositions. Therefore, this seepage cannot be classified as Annex I Petrifying spring habitat.
LQ I09	<i>Ctenidium molluscum</i> , <i>Dicranella varia</i> , <i>Didymodon tophaceus</i> , <i>Epilobium parviflorum</i> , <i>Fissidens adianthoides</i> , <i>Hypericum pulchrum</i> , <i>Pellia endiviifolia</i> , <i>Ranunculus acris</i> , <i>Ranunculus repens</i> , <i>Rubus fruticosus</i> agg., <i>Salix aurita</i> , <i>Salix cinerea</i> , <i>Tussilago farfara</i> .	Three species listed as indicative of [7220] habitat by NPWS (2013) and Lyons & Kelly (2016), but not according to CEC (2013), <i>Didymodon tophaceus</i> , <i>Fissidens adianthoides</i> and <i>Pellia endiviifolia</i> , are present in this seepage, and tufa is forming, primarily amongst and between cushions of <i>D. tophaceus</i> , over a limited area. However, there are no other indicative species of tufa springs present, and tufa is only present over a small area. It is likely that, over time, this tufa would continue to accumulate, and become more extensive, and other species indicative of tufa, such as <i>Palustriella</i> spp. and <i>Eucladium verticillatum</i> may colonise this spring. A small area of this seepage could be classified as corresponding to the Annex I habitat 7220, although at present it is a marginal example of the habitat, representing a recent colonisation of an artificially created quarry face.
LQ I10	Seepage inaccessible	This seepage was not accessible, as located on an inaccessible cliff face, but little vegetation cover was observed, with small amounts of tufa depositions likely to be present. This seepage may or may not contain potential Annex I Petrifying spring habitat, but it is not likely to be different in composition to that observed in association with other seepages.
LQ I11	<i>Blackstonia perfoliata</i> , <i>Brachypodium sylvaticum</i> , <i>Carex flacca</i> , <i>Dicranella varia</i> , <i>Didymodon tophaceus</i> , <i>Fissidens adianthoides</i> , <i>Holcus lanatus</i> , <i>Leontodon hispidus</i> , <i>Sonchus oleraceus</i> , <i>Tussilago farfara</i> .	Two indicator species, <i>Didymodon tophaceus</i> and <i>Fissidens adianthoides</i> , and small amounts of tufaceous deposits are present in this seepage, but are not growing in association with each other, so this seepage does not qualify as Annex I Petrifying spring habitat.

LQ I12	<i>Agrostis stolonifera</i> , <i>Dicranella varia</i> , <i>Didymodon tophaceus</i> , <i>Epilobium parviflorum</i> , <i>Fissidens adianthoides</i> , <i>Sonchus oleraceus</i> , <i>Tussilago farfara</i> .	Two indicator species of Annex I Petrifying spring habitat, <i>Didymodon tophaceus</i> and <i>Fissidens adianthoides</i> , and small amounts of tufaceous deposits are present in this seepage, but are not growing in association with each other, so this seepage does not qualify as Annex I Petrifying spring habitat.
LQ I13	<i>Buddleia davidii</i> , <i>Dicranella varia</i> , <i>Holcus lanatus</i> , <i>Leontodon hispidus</i> , <i>Salix caprea</i> , <i>Sonchus oleraceus</i> , <i>Tussilago farfara</i> .	No tufa, or species indicative of Petrifying spring habitat, are present in this seepage, so it does not contain any potential Annex I Petrifying spring habitat.
LQ I14	<i>Blackstonia perfoliata</i> , <i>Carex pendula</i> , <i>Dicranella varia</i> , <i>Epilobium parviflorum</i> , <i>Geranium robertianum</i> , <i>Holcus lanatus</i> , <i>Leontodon hispidus</i> , <i>Leucanthemum vulgare</i> , <i>Scrophularia nodosa</i> , <i>Tussilago farfara</i> .	No tufa, or species indicative of Petrifying spring habitat, are present in this seepage, so it does not contain any potential Annex I Petrifying spring habitat.
LQ I15	<i>Bryum pseudotriquetrum</i> , <i>Carex flacca</i> , <i>Carex pendula</i> , <i>Centaurea nigra</i> , <i>Didymodon tophaceus</i> , <i>Epilobium parviflorum</i> , <i>Equisetum pratense</i> , <i>Festuca rubra</i> , <i>Fissidens adianthoides</i> , <i>Holcus lanatus</i> , <i>Leontodon hispidus</i> , <i>Lotus uliginosus</i> , <i>Preissia quadrata</i> , <i>Scrophularia nodosa</i> , <i>Sonchus oleraceus</i> , <i>Tussilago farfara</i> .	Although four species indicative of Annex I Petrifying spring vegetation in Ireland are present, there is no tufa present, and these species are not growing directly in association with each other, so Annex I Petrifying spring habitat is not present in this seepage.
LQ I16	None present	No plant species, and no deposits of tufa, were found in association with this seepage, so this seepage contains no Annex I tufa spring habitat.
LQ I17	<i>Dicranella varia</i> , <i>Festuca rubra</i> , <i>Hieracium sp.</i> , <i>Leontodon hispidus</i> , <i>Lotus uliginosus</i> , <i>Scrophularia nodosa</i> , <i>Sesleria caerulea</i> , <i>Sonchus oleraceus</i> , <i>Tussilago farfara</i> .	Only one indicator species of tufa-forming springs, <i>Festuca rubra</i> , is present but does not occur in association with tufa, which is not present in this seepage. Therefore, Annex I Petrifying spring habitat is not present
LQ I18	<i>Blackstonia perfoliata</i> , <i>Carex flacca</i> , <i>Centaurea nigra</i> , <i>Dactylis glomerata</i> , <i>Dicranella varia</i> , <i>Hieracium sp.</i> , <i>Holcus lanatus</i> , <i>Leontodon hispidus</i> , <i>Linum catharticum</i> , <i>Preissia quadrata</i> , <i>Sonchus oleraceus</i> , <i>Trichostomum crispulum</i> , <i>Tussilago farfara</i> .	No tufa, or species indicative of Petrifying spring habitat, are present in this seepage, so it does not contain any potential Annex I Petrifying spring habitat.
LQ I19	Seepage inaccessible	This seepage was located at ca. 10m up a vertical cliff face, so was not accessible, and there was no evidence for the presence of tufa.

LQ I20	<i>Centaurea nigra</i> , <i>Dactylis glomerata</i> , <i>Dicranella varia</i> , <i>Fissidens adianthoides</i> , <i>Linum catharticum</i> , <i>Lotus uliginosus</i> , <i>Pohlia sp.</i> , <i>Taraxacum officinalis</i> , <i>Teucrium scorodonia</i> , <i>Tussilago farfara</i> .	Only one indicator species of tufa-forming springs, <i>Fissidens adianthoides</i> , is present but there was no tufa present, so it does not contain any potential Annex I Petrifying spring habitat.
LQ I21	<i>Agrostis stolonifera</i> , <i>Dicranella varia</i> , <i>Epilobium parviflorum</i> .	No tufa, or species indicative of Petrifying spring habitat, are present in this seepage, so it does not contain any potential Annex I Petrifying spring habitat.
LQ I22	<i>Epilobium parviflorum</i> , <i>Equisetum pratense</i> , <i>Taraxacum officinalis</i> , <i>Tussilago farfara</i> .	No tufa, or species indicative of Petrifying spring habitat, are present in this seepage, so it does not contain any potential Annex I Petrifying spring habitat.
LQ I23	<i>Aneura pinguis</i> , <i>Dicranella varia</i> , <i>Leiocolea badensis</i> , <i>Tussilago farfara</i> .	Only one indicator species of tufa-forming springs, <i>Aneura pinguis</i> , is present but there was no tufa present, so it does not contain any potential Annex I Petrifying spring habitat.
LQ I24	<i>Bryum bicolor</i> , <i>Dicranella varia</i> , <i>Tussilago farfara</i> .	No tufa, or species indicative of Petrifying spring habitat, are present in this seepage, so it does not contain any potential Annex I Petrifying spring habitat.
LQ I25	<i>Blackstonia perfoliata</i> , <i>Buddleia davidii</i> , <i>Dicranella varia</i> , <i>Didymodon tophaceus</i> , <i>Festuca rubra</i> , <i>Leiocolea badensis</i> , <i>Salix cinerea</i> , <i>Senecio vulgaris</i> , <i>Sonchus oleraceus</i> , <i>Tussilago farfara</i> .	Two species listed as indicative of [7220] habitat by NPWS (2013) and Lyons & Kelly (2016), but not according to CEC (2013), <i>Didymodon tophaceus</i> and <i>Festuca rubra</i> , are present in this seepage, and tufa is forming, primarily amongst and between cushions of <i>D. tophaceus</i> , over a limited area. However, there are no other indicative species of tufa springs present, and tufa is only present over a small area. It is likely that, over time, this tufa would continue to accumulate, and become more extensive, and other species indicative of tufa, such as <i>Palustriella spp.</i> and <i>Eucladium verticillatum</i> may colonise this spring. A small area of this seepage could be classified as corresponding to the Annex habitat 7220, although at present it is a marginal example of the habitat, representing a recent colonisation of an artificially created quarry face.

LQ I26	<i>Agrostis stolonifera</i> , <i>Dicranella varia</i> , <i>Didymodon tophaceus</i> , <i>Senecio vulgaris</i> , <i>Tussilago farfara</i> .	Only one indicator species of tufa-forming springs, <i>Didymodon tophaceus</i> , is present but not occurring in association with tufa, which is not present in this seepage. Therefore, Annex I Petrifying spring habitat is not present.
LQ I27	None present	No plant species, and no deposits of tufa, were present in association with this seepage, so it does not contain any potential Annex I Petrifying spring habitat.

Status of 7220 *Petrifying springs with tufa formations (*Cratoneurion*) in Lackagh Quarry

Of the twenty seven seepages surveyed for the presence of Annex I tufa-forming petrifying springs, six were found to contain potential Annex I Petrifying spring habitat; all located on the west face of the quarry. The other walls of the quarry were different in character, with less calcareous material deposited on the rock face, and generally less vegetation present, and are not likely to be suitable for the formation of Petrifying spring habitat. The tufa springs that have formed in the seepages on the west face of the quarry are generally species poor, with only *Didymodon tophaceus*, and occasionally *Dicranella varia* and *Pellia endiviifolia* actually growing in association with the tufa deposits. Therefore, there is not a vegetation community, per se, growing in association with the tufa; in most cases the vegetation consisting of just *Didymodon tophaceus*.

These seepages can be classified as 7220 *Petrifying springs, although they are marginal examples, lacking many of the key indicative species and are generally limited in extent; in some cases occurring only in the immediate vicinity of cushions of *Didymodon tophaceus*. They are also only present due to human activity, with the quarrying of limestone resulting in the creation of suitable habitat for their formation, and are arguably of limited conservation value. However, as these springs are relatively recently created, they are likely to continue to increase in extent if left undisturbed, and characteristic species of petrifying tufa springs, such as *Palustriella commutata* may become established in the future, increasing their conservation value.

References

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