

Appendix 10.7
Arklow Bridge
Bryophyte Survey



**ARKLOW BRIDGE, ARKLOW, CO. WICKLOW
BRYOPHYTE SURVEY**

November 2020



**Report produced by Denyer Ecology for:
Aquafact**

CONTENTS

1 INTRODUCTION 3

1.1 Background..... 3

1.2 Aims..... 3

1.3 Site..... 3

2 METHODOLOGY..... 3

2.1 Desktop information 3

2.2 Bryophyte survey 4

2.3 Identification of specimens 4

2.4 Ecological evaluation..... 4

2.5 Plant species nomenclature 4

2.6 Limitations..... 4

3 SURVEY RESULTS AND DISCUSSION 4

3.1 Bryophyte habitats 4

3.2 Bryophyte species 4

4 CONCLUSIONS AND RECOMMENDATIONS11

REFERENCES.....11

1 INTRODUCTION

1.1 Background

Denyer Ecology was commissioned by Aquafact to undertake a bryophyte survey of Arklow Bridge, Arklow, Co. Wicklow. This survey was requested by NPWS in relation to proposed bridge renovation works. Although there were a number of bryophyte records from Arklow town (1975), there were no recent records from the town and no records localised to the bridge. The potential to support a bryophyte flora of conservation interest was unknown.

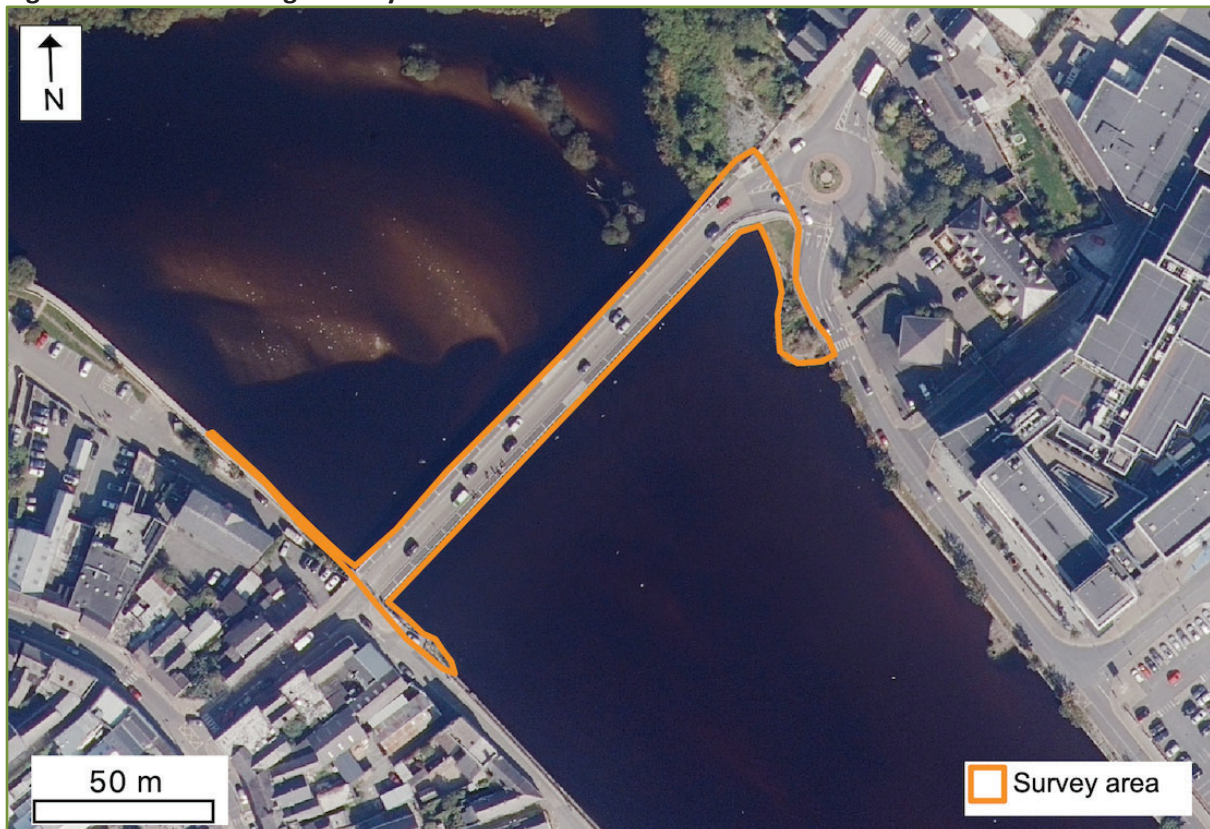
1.2 Aims

The aim of the survey was to undertake a bryophyte survey of all accessible areas of the bridge to determine whether the site supports/ has the potential to support any bryophytes of conservation interest. This included aquatic, terrestrial and saxicolous bryophyte species.

1.3 Site

The site location is shown in Figure 1.1. The project area includes accessible areas of the bridge and adjacent watercourse edge. The bryophyte habitats surveyed include aquatic species on stonework and stones below high tide level, saxicolous species on the bridge above high tide level and terrestrial species on disturbed soil adjacent to the watercourse at the high tide level.

Figure 1.1. Arklow Bridge survey area



RGB Aerial Photography - © Bluesky Geospatial Limited

2 METHODOLOGY

2.1 Desktop information

The following resources were consulted:

- GIS boundaries of designated site data (data accessed via NPWS website).
- Aerial photography (Bing maps and Bluesky mapping).
- British Bryological Society Atlas of British and Irish bryophytes (Blockeel et al., 2014a & 2014b).

- British Bryological Society Atlas dataset

2.2 Bryophyte survey

The site was walked over by an experienced bryologist in November 2020. The site survey area is shown on Figure 1.1. All accessible areas of the site that were considered of potential interest for bryophytes were surveyed (see also Section 2.6 'Limitations' below). All bryophytes encountered in the field were recorded on a recording card.

2.3 Identification of specimens

Any specimens that could not be identified in the field, or required confirmation, were collected and examined using a microscope.

2.4 Ecological evaluation

The rarity (local and national) and legal protection of the bryophytes recorded from the site were assessed using a number of resources:

- Flora (Protection) Order, 2015.
- Ireland Red List No. 8. Bryophytes: Mosses, Liverworts & Hornworts (Lockhart et al., 2012a).
- British Bryological Society Atlas of British and Irish bryophytes (Blockeel et al., 2014a & 2014b).
- British Bryological Society Atlas dataset.

2.5 Plant species nomenclature

The bryophyte nomenclature adopted by Blockeel et al. (2014a & b) is used; this is based on the *Checklist of British and Irish bryophytes* (Hill et al., 2009) with minor modifications to reflect recent taxonomic changes. Note that a new checklist is due to be published in early 2021 and some of the names included in this report will be changed.

2.6 Limitations

There were limitations on accessing the stonework of the bridge:

- The site was visited at low tide, but the water levels and flow were still too high to access the bridge arches within the river channel. These were viewed with binoculars and similar stonework up and downstream of the bridge was surveyed to assess the typical bryophyte flora present at the site. As the stonework of the bridge below the high tide level has very little bryophyte cover, this was not considered to limit the survey results.
- The top surface of the bridge comprises concrete with railings on either side of the footpath. It was possible to view the top side of the concrete through the railings. There was very little bryophyte cover on the stonework below the concrete layer.

3 SURVEY RESULTS AND DISCUSSION

3.1 Bryophyte habitats

The main bryophyte habitats present at the site are:

- concrete at the top of the bridge on either side (above high tide level) (Photographs 3.1 to 3.4);
- bridge stonework (below high tide level) Photographs 3.5 to 3.6);
- walls and stonework at the edge of the river upstream and downstream of the bridge (between low and high tide levels) (Photographs 3.7 to 3.8);
- disturbed soil at the edges of the riverbank below the bridge (at high tide level) (Photographs 3.9 and 3.10).

3.2 Bryophyte species

Details of all bryophyte species recorded, their abundance at the site and local and national rarity are given in Table 3.1.

A total of 19 bryophytes were recorded during the survey. These were all mosses, and no liverworts were recorded. This is relatively low diversity for a large old stone bridge and lowland river in Ireland. Much of the bridge stonework did not support bryophytes and it may be that either the bridge has been cleaned in the past or the stone is smooth and offers little hold potential for mosses. The top stonework of the bridge has been replaced with concrete and this was dominated by a few species typical of urban, calcareous, relatively smooth surfaces. There were few aquatic mosses, and this may be due to the tidal nature of the river in this location and slightly brackish water.

County Wicklow has a diverse bryophyte flora for an eastern Irish county, mainly due to the presence of a range of upland habitats. Some sites and habitats have been very well recorded for bryophytes, but urban and lowland habitats have been as well recorded. Four species were recorded from Arklow bridge that have less than 10 records within Co. Wicklow (Vice County H20). These are: *Didymodon nicholsonii*, *Leptodictyum riparium*, *Syntrichia laevipila* and *Syntrichia montana*. These are species of lowland urban or lowland river habitats and all are widespread nationally and it is considered that they are under-recorded within Co. Wicklow, rather than genuinely rare. *Didymodon nicholsonii* was recorded upstream of the bridge; *Leptodictyum riparium* from both sides of the river downstream of the bridge; and both *Syntrichia* species from side concrete at the very western end of the bridge, near to the roundabout.

Photographs 3.1-3.10

Photograph 3.1. Bryophytes frequent on top concrete of bridge (W side of bridge). *Grimmia pulvinata* is dominant on the drier top surface and *Schistidium crassipilum* on the lower, slightly more shaded concrete. W side of bridge.



Photograph 3.2. *Grimmia pulvinata* on top surface of concrete on bridge. W side of bridge.



Photograph 3.3. *Schistidium crassipilum* and *Orthotrichum anomalum* on the side of the concrete surface at top of bridge. W side of bridge.



Photograph 3.4. *Syntrichia latifolia* and *Syntrichia ruralis* on concrete at the N end of W side of the bridge.



Photograph 3.5. Stonework on bridge arches (above high tide) has little/ no bryophyte cover. E side of bridge.



Photograph 3.6. Stonework on bridge arches (below high tide) has little/ no bryophyte cover. Red arrows show the small amount of aquatic moss *Fontinalis antipyretica*. E side of bridge.



Photograph 3.7. Absence of aquatic bryophytes on stonewall and gravel downstream of bridge. Red arrow indicates high tide level. N bank of the river.



Photograph 3.8. Concrete wall and stonework at the edge of the river, downstream of the bridge. Bryophytes locally frequent and dominated by urban species of walls and disturbed ground. S bank of the river.



Photograph 3.9. The aquatic moss *Fontinalis squamosa* (red arrow) on gravel downstream of the bridge, between the high and low tide levels. N bank of the river.



Photograph 3.10. The aquatic moss *Leptodictyum riparium* growing below high tide level on soil between boulders downstream of the bridge. S bank of river.



Table 3.1. Arklow Bridge bryophyte species list

Species	Group	Red List*	Distribution within site	Distribution nationally	Distribution locally (H20)
<i>Brachythecium rivulare</i>	Moss	LC	Occasional on soil/ grassy areas downstream of bridge	Widespread	Widespread
<i>Bryum argenteum</i>	Moss	LC	Frequent on concrete of bridge and footpath	Widespread	Widespread
<i>Bryum capillare</i>	Moss	LC	Frequent on concrete of bridge and also just above high tide water mark on inside of bridge arches	Widespread	Widespread
<i>Bryum dichotomum</i>	Moss	LC	Frequent on stonewalls and soil at the edges of the river, up and downstream of bridge. Locally frequent on stonewall just above high tide line upstream of the bridge.	Widespread	Widespread
<i>Didymodon insulanus</i>	Moss	LC	Occasional on concrete	Widespread	Widespread
<i>Didymodon nicholsonii</i>	Moss	LC	Occasional on damp concrete and on stonewall just above high tide line upstream of the bridge.	Widespread	Occasional: <10 records
<i>Didymodon rigidulus</i>	Moss	LC	Frequent on concrete of bridge	Widespread	Widespread
<i>Fontinalis antipyretica</i>	Moss	LC	Occasional on inside of bridge arches, between the low and high tide water levels. Occasional on stones at the edge of the river, downstream of the bridge.	Widespread	Widespread
<i>Fontinalis squamosa</i>	Moss	LC	Present in one location on stones between high and low tide level, downstream of the bridge.	Frequent in N and W and upland areas, rare in midlands	Widespread
<i>Grimmia pulvinata</i>	Moss	LC	Frequent to abundant on concrete on bridge. The most frequent bryophyte on the top and east facing drier concrete habitat.	Widespread	Widespread
<i>Leptodictyum riparium</i>	Moss	LC	Occasional on stones between low and high tide downstream of the bridge on both sides of the river	Widespread	Rare: <5 records
<i>Orthotrichum anomalum</i>	Moss	LC	Frequent on concrete of bridge	Widespread	Widespread
<i>Oxyrrhynchium hians</i>	Moss	LC	Occasional on damp soil just above high tide level downstream of the bridge	Widespread	Widespread
<i>Platyhypnidium riparioides</i>	Moss	LC	Occasional on stones between low and high tide downstream of the bridge on both sides of the river. None recorded on bridge.	Widespread	Widespread
<i>Schistidium crassipilum</i>	Moss	LC	Frequent on concrete of bridge	Widespread	Widespread
<i>Syntrichia latifolia</i>	Moss	LC	Occasional on soil accumulated on concrete at the northern end of the bridge	Widespread	Rare: <5 records
<i>Syntrichia montana</i>	Moss	LC	Occasional on concrete of bridge	Widespread	Occasional: <10 records
<i>Syntrichia ruralis</i> var. <i>ruralis</i>	Moss	LC	Occasional on soil accumulated on concrete at the northern end of the bridge and on soil downstream of the bridge	Widespread	Widespread
<i>Tortula muralis</i>	Moss	LC	Frequent on concrete of bridge	Widespread	Widespread

*LC = Least Concern

4 CONCLUSIONS AND RECOMMENDATIONS

The main habitats for bryophytes within the survey area were the concrete on top of the bridge (above high tide level), stonework up and downstream of the bridge (at high tide level) and (to a lesser extent) the bridge stonework between high and low tide level (aquatic moss species).

The bridge and adjacent habitats had relatively **low bryophyte species diversity** with a total of 19 mosses recorded. None of these species are nationally rare or listed on the Flora (Protection) Order. Four species which have less than 10 records within County Wicklow were recorded. However, these are widespread and common species, which are likely to be under-recorded in Co. Wicklow. **It is not considered that the bridge supports a bryophyte flora of conservation interest.** However, it does support moderate to high bryophyte cover in some areas (e.g. the top concrete) and it is recommended that bryophyte cover be retained where possible. Where bryophytes do need to be removed from a surface, the surface should be replaced with similar material and the use of very smooth surfaces should be avoided. Urban and aquatic bryophytes tend to quickly re-colonise surfaces as long as there is some texture to the surface.

REFERENCES

- BBS** (2009). *Checklist of British and Irish bryophytes*. The British Bryological Society, Stafford, U.K.
- Blockeel, T.L., Bosanquet, S.D.S. Bosanquet, Hill, M.O. and Preston, C.D.** (2014a). *Atlas of British and Irish bryophytes*. Volume 1. British Bryological Society (Pisces Publications, Newbury).
- Blockeel, T.L., Bosanquet, S.D.S. Bosanquet, Hill, M.O. and Preston, C.D.** (2014b). *Atlas of British and Irish bryophytes*. Volume 2. British Bryological Society (Pisces Publications, Newbury).
- Bosanquet, S.** (2009). Identification: *Orthotrichum* – Britain’s bristle-mosses. *British Wildlife*: 20 (3) 187-194.
- Lockhart, N.,** Hodgetts, N. & Holyoak, D. (2012a). *Ireland Red List No.8: Bryophytes*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Lockhart, N.,** Hodgetts, N. & Holyoak, D. (2012b). *Rare and threatened Bryophytes of Ireland*. National Museums of Northern Ireland, Holywood.