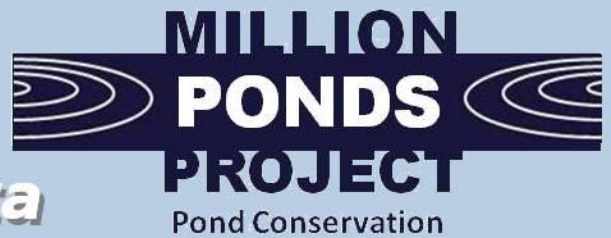


Creating ponds for Marsh Clubmoss *Lycopodiella inundata*



A 50-YEAR PROJECT TO CREATE A NETWORK OF CLEAN WATER PONDS FOR FRESHWATER WILDLIFE

1. What is Marsh Clubmoss?

Marsh Clubmoss *Lycopodiella inundata* is not a true moss but a primitive non-flowering plant which is more closely related to ferns! It has a distinctive lime-green colour and looks like the young tips on the ends of spruce trees. It has creeping horizontal stems that grow to between 5-20cm in length and vertical spore producing shoots, 5-8cm tall, which appear in late summer (Figure 1).

The grazed wet heathland habitats favoured by Marsh Clubmoss have undergone a massive decline throughout its north-west European range and as a result the UK now holds a substantial proportion of the global population. Historically, the species occurred in about 250 ten km squares but is now restricted to just ten scattered areas (Figure 2). It is classified as Endangered and protected under Schedule 8 of the Wildlife and Countryside Act.



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Figure 1. The unmistakable upright stems of Marsh Clubmoss.

2. Habitat requirements

Marsh Clubmoss is associated with **wet heathlands and peat pools**, growing alongside other acid loving wetland plants such as White Beak-sedge *Rhynchospora alba*, sundews *Drosera* spp. and *Sphagnum* mosses.

It grows on the **margins of small pools**, which may form in depressions in trackways or sloping seepage mires, but always where there is some disturbance, e.g. **grazing, movement of machinery or small scale turf cutting** to maintain very open conditions and a ready supply of bare ground.

It has also been recorded on the **margins of oligotrophic lakes** and in abandoned quarries, but always where there is deposition of silt and fluctuating water levels to maintain open conditions.

Key messages

- Locate new scrapes or shallow pools adjacent to existing or historical Marsh Clubmoss sites. Marsh Clubmoss spores will remain dormant for a long time waiting for suitable conditions to reoccur.
- Suitable areas are found in wet peaty heathland and peat. Care is needed not to damage existing habitats and not to remove the existing spore bank.
- Create scrapes or very shallow ponds where the summer water levels remain at, or very close to the soil surface, either because of high water table levels, or because of the presence of seepages.
- A short sward with patches of bare ground needs to be maintained, and the best way to do this is by grazing.
- Sites along track-ways that focus grazing pressure are ideal places for pond creation.
- Make a complex of pools or scrapes. Marsh Clubmoss will move between sites as conditions change.

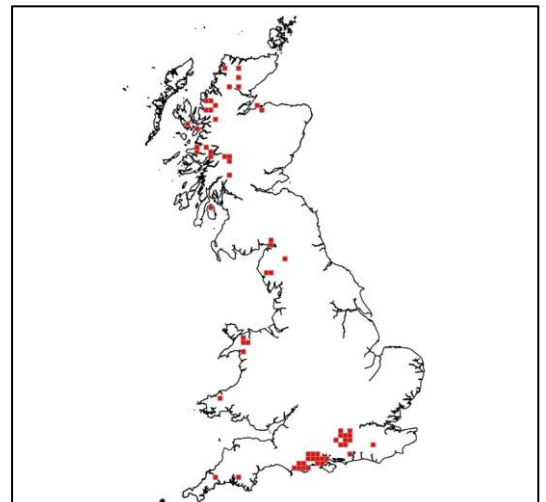


Figure 2. Current distribution of Marsh Clubmoss in the UK.

Data supplied by the BSBI

3. Pond designs for Marsh Clubmoss

Creating scrapes or shallow pools for Marsh Clubmoss is usually simple and cheap. It can both help to support existing populations, and restore habitats where Marsh Clubmoss has been lost.

Locating ponds

- **Marsh clubmoss grows on peat soils** and other thin organic deposits overlaying sand and gravel substrates. Peat is a very fragile habitat type and receives European protection, so it is important never to dig into peat without first assessing the value of the habitat. However, there are often opportunities for pond creation where the habitat has become dominated by species such as Purple Moor-grass *Molinia caerulea*, provided that appropriate grazing management is instigated following pond creation. Successes for Marsh Clubmoss have also been achieved where pools form in trackways which have been created as part of management of sites (Box 1).



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Figure 3. White Beak-sedge an indicator of good Marsh Clubmoss habitat.

Water source

- **Water levels must remain just below the surface of the soil** in the summer months. Marsh Clubmoss cannot withstand permanent inundation but equally it cannot survive where the soil dries out completely. White Beak-sedge (Figure 3) is so typical of this bare wet peat habitat that it provides a good indication of suitable habitat for Marsh Clubmoss. Groundwater fed pools with fluctuating water levels are ideal, as the habitat remains free from dominant stands of either heathland or mire vegetation (Figure 4). Shallow peat cuts and the transitional zone on valley slopes often provides the ideal balance between wet and dry.
- **Wet heathlands are low nutrient habitats** which results in a specialist flora and fauna. It is therefore important to locate scrapes and pools where they will be protected from nutrient run-off. Marsh Clubmoss occurs in pools overlaying acidic bedrock, with water that has a pH of between 4.4 and 5.8. These habitats are also vulnerable to pollution, both terrestrial and atmospheric.

Pond Complexes

- **Creating a complex of damp scrapes or shallow pools** is critical for a plant like Marsh Clubmoss. The small pools it occupies are often transient habitat and will disappear and reappear across an area of heathland in response to changes in grazing pressure. Marsh clubmoss is able to move around a site following suitable conditions. A complex of ponds will help to strengthen the population buffering it from extinction events.



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Figure 4. Marsh Clubmoss habitat in summer (left) and winter (right) showing fluctuating water levels and bare ground habitat.



Box 1. Habitat creation for Marsh Clubmoss at Bovington, Dorset

The RSPB Dorset Heathland Project was set up in 1989 to restore declining heathland habitat. The project has been successful in extending the area of good quality heathland through management which has increased habitat complexity, creating niches for many species including Marsh Clubmoss.

In 2004, trackways created by machinery doing management works created areas of bare soil which held shallow standing water during the winter months. The following summer over 100m of this pioneer habitat was carpeted with Marsh Clubmoss plants.

These pools were created by vehicles, but compacted depressions such as these can equally be created by the action of grazing animals which have been walking these landscapes for thousands of years. We can replicate this habitat by creating a complex of small pools which will attract grazing stock, thereby maintaining pioneer habitat ideal for Marsh Clubmoss and other wet heathland species.



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Pond shape, depth and size

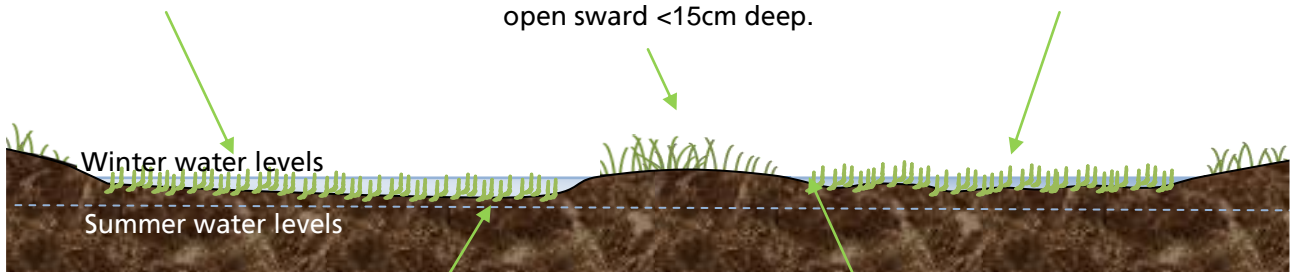
Creating ponds for Marsh Clubmoss does not need complicated design plans (Figure 5). If the correct location is chosen, any depression which holds water for part of the year may be suitable for Marsh Clubmoss. Creating small shallow temporary pools is as easy as digging a 1m² shallow pit (graded over a range of depths from 1-30cm deep). If the pond never holds water nothing has been lost, the depressions will add to the micro-topography of the site. If creating ponds in one area is particularly successful, focus on creating more pools there in the future.

Figure 5. Pond designs for Marsh Clubmoss

Pools can be created to replicate turf cut ponds. These should be 20-30cm deep and 1-2m in width.

Create shallow pools in off-road trackways which receive periodic, but not continual disturbance.

Grazing maintains a short, open sward <15cm deep.



Summer water levels remain just below the soil surface. The peat substrate should remain damp but not inundated.

Winter water levels should cover the area occupied by Marsh Clubmoss. This will reduce the cover of more dominant species and allow spore dispersal to new pools.

4. Management for Marsh Clubmoss

Sites need periodic disturbance in order to maintain open habitat. The most sustainable option is grazing with cattle or horses, but off-road vehicle traffic has also been used to create periodic disturbance on sites where grazing is not an option. The fragility of peaty habitats means that they require little disturbance to create bare ground. Ponds created adjacent to trackways will receive periodic but not very heavy trampling pressure, whilst grazing will maintain a short sward (Figure 6). Spores and fragments of plant will also be moved to new sites on the hooves of grazing stock.

Fluctuating water levels on the sheltered margins of lakes will also create new habitat. It can be too prescriptive to give precise values, but in general pools suitable for marsh clubmoss have over 50% bare ground and a vegetation height less than 15cm.

Support for traditional management. The pastoral economy of traditional grazed heathlands and commonlands needs recognition and support as it is essential to the continued survival of Marsh Clubmoss and other rare plants and invertebrates.

More involved management work, such as periodic disturbance using vehicles and scrub removal will be needed on sites which lack grazing. Scrub should also be cleared from new sites before pond creation begins.

Small pools in peaty habitats can disappear relatively quickly because once turf is removed the peat can expand and fill the hole. Ideally new pools should be created as old pools fill in. Historically, new pools were also created by small scale peat cutting and this is a practice which can be replicated on a smaller scale. Grazing also helps to slow down the process of infilling by poaching the pond margins.

Figure 6. Locating ponds for Marsh Clubmoss to optimise grazing pressure alongside trackways across heathland

Small water bodies are more easily poached particularly if they are positioned in areas with heavy use by stock – e.g. alongside trackways.



Even during the dry summer months sub-surface water keeps the pools of Marsh Clubmoss damper than the surrounding heath.



A complex of ponds will strengthen the population, allowing Marsh Clubmoss to move between ponds as conditions become suitable.



5. Further reading

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For further information about the Million Ponds Project and to consult other factsheets in the Pond Creation Toolkit, please visit www.pondconservation.org.uk/millionponds or email enquiries to info@pondconservation.org.uk

