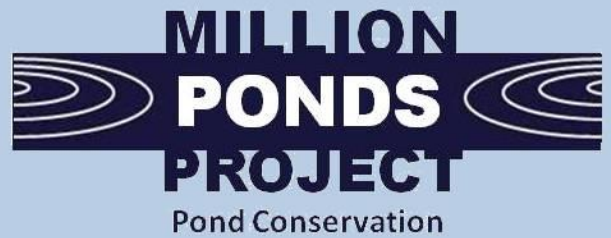


# Creating ponds for the Crystal Moss Animal *Lophopus crystallinus*



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

## 1. Introducing the Crystal Moss Animal

The Crystal Moss Animal *Lophopus crystallinus* is a tiny creature that lives in colonies that typically measure 5-10 mm across and has a gelatinous coating. Out of water, a colony can look like snail or fish eggs, but in water the tentacled polyps are quite distinctive and very beautiful (Figure 1). Although it lives happily in clean water, recent studies show it increases in abundance in nutrient-rich rivers so it may be a relatively easy species to protect, provided the correct habitat structure is in place.

This species was once common and widespread but it has suffered a severe decline in the UK because of the loss of suitable habitat and is now only known from a handful of sites. As a result this species is now classified as Rare in Britain and is a Priority Species on the Biodiversity Action Plan.



**Figure 1.** The bryozoan *Lophopus crystallinus* and its gelatinous colony growing on woody debris.

### Key messages

- Create ponds within the current or historical distribution of the Crystal Moss Animal to provide habitat on which statoblasts can grow.
- Create stream-fed ponds to provide running water and a regular supply of nutrients.
- Create ponds in predominantly low intensity catchments, this will limit pollutants but maintain high levels of nutrients.
- Provide substrates for Crystal Moss Animal:
  - Design ponds with gently shelving margins to encourage emergent plants
  - Avoid the tendency to tidy-up ponds - leave woody debris.

## 2. Key habitat requirements

The preferred habitat requirements of this animal are not entirely clear, what we know is that the colonies need:

- **A substrate on which to grow.** Ponds should contain debris or stands of emergent vegetation to provide a base for The Crystal Moss Animal.
- **A flow of water to supply their food,** i.e. it lives in ponds connected to running waters. Very fast waters are unsuitable for the Crystal Moss Animal as its anchorage is weaker than other moss animals, but where the flow of water is too slow, food may be too scarce.
- **Mesotrophic to hypereutrophic conditions,** so that there is a good supply of algae and bacteria to feed on. This food supply is dependent on inputs of nutrients into the system. *Naturally* nutrient rich ponds and lakes have become a rare habitat type in the UK because many lowland rivers and standing waterbodies are polluted by nutrients at concentrations considerably in excess of natural levels. However, provided substrate is available for attachment the Crystal Moss Animal is able to withstand very nutrient-rich waters.

### 3. What do we know about the Crystal Moss Animal?

The Crystal Moss Animal is found in slow to fast moving rivers in other parts of Europe and also in North America, but it is a rare species across its entire range. In the UK, populations have been recorded as far north as the Humber. Waterbodies in Southern England, the Midlands and Wales all have the potential to support this species.

The Crystal Moss Animal has suffered large declines in Britain, but new sampling methods that target statoblasts (Box 1) have improved our ability to detect its presence and in the past few years some 45 new sites have been recorded in southern England. But even with these new records, the Crystal Moss Animal remains rare.

#### *Why it has declined*

The exact causes of the decline in the Crystal Moss Animal are unclear, particularly as statoblasts can survive drought and adult colonies can tolerate some pollution.

Physical disturbance may be an important factor, as colonies do not appear to be good at surviving such events. Tidying waterbodies, in particular the removal of fallen wood and other debris also deprives colonies of their anchor points. The loss of emergent and submerged water plants in the Norfolk Broads through eutrophication/pollution has had a similar effect.

It is likely that Crystal Moss Animal colonies are relatively ephemeral, persisting over a wide area but appearing in individual waterbodies only when conditions are right (a metapopulation). In this way, individual colonies may be short-lived but high rates of colonisation quickly replenish populations that are lost. This population structure will break down if local extinctions outstrip recolonisation events, resulting in overall population decline.

#### *Why will creating new ponds help?*

New ponds will provide new sites for Crystal Moss Animals within the regions where it occurs. This is especially important where this animal persists by moving between ponds as conditions change, as these populations work best when there is a surplus of unoccupied habitat to be colonised.

### 4. Pond designs for Crystal Moss Animal

Pond creation for the Crystal Moss Animal is very simple in theory, as it simply requires widening a section of stream. However, this is **NOT** best practice for most pond species because on-line ponds usually lack clean water (for further information see [Pond Creation Toolkit Factsheet 2](#)).

The Crystal Moss Animal needs flowing water and a source of food, but may suffer in very disturbed sites or where water is heavily polluted because this affects plant growth and so would affect the availability of substrate to attach itself to.

The Environment Agency will be concerned to ensure that any on-line ponds do not cause a significant obstruction to floodwater movement. Depending on the size of the pond you may need a reservoir licence. Contact the Environment Agency directly for further advice [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk).

#### Box 1. What is a statoblast?

Bryozoans like the Crystal Moss Animal reproduce asexually: a mass of cells breaks free from the parent animal, enclosed within a chitinous envelope called a statoblast. This structure can remain dormant for long periods waiting for the correct conditions to occur.



**Figure 2.** The statoblasts are the seed like pips visible in this moss animal colony.

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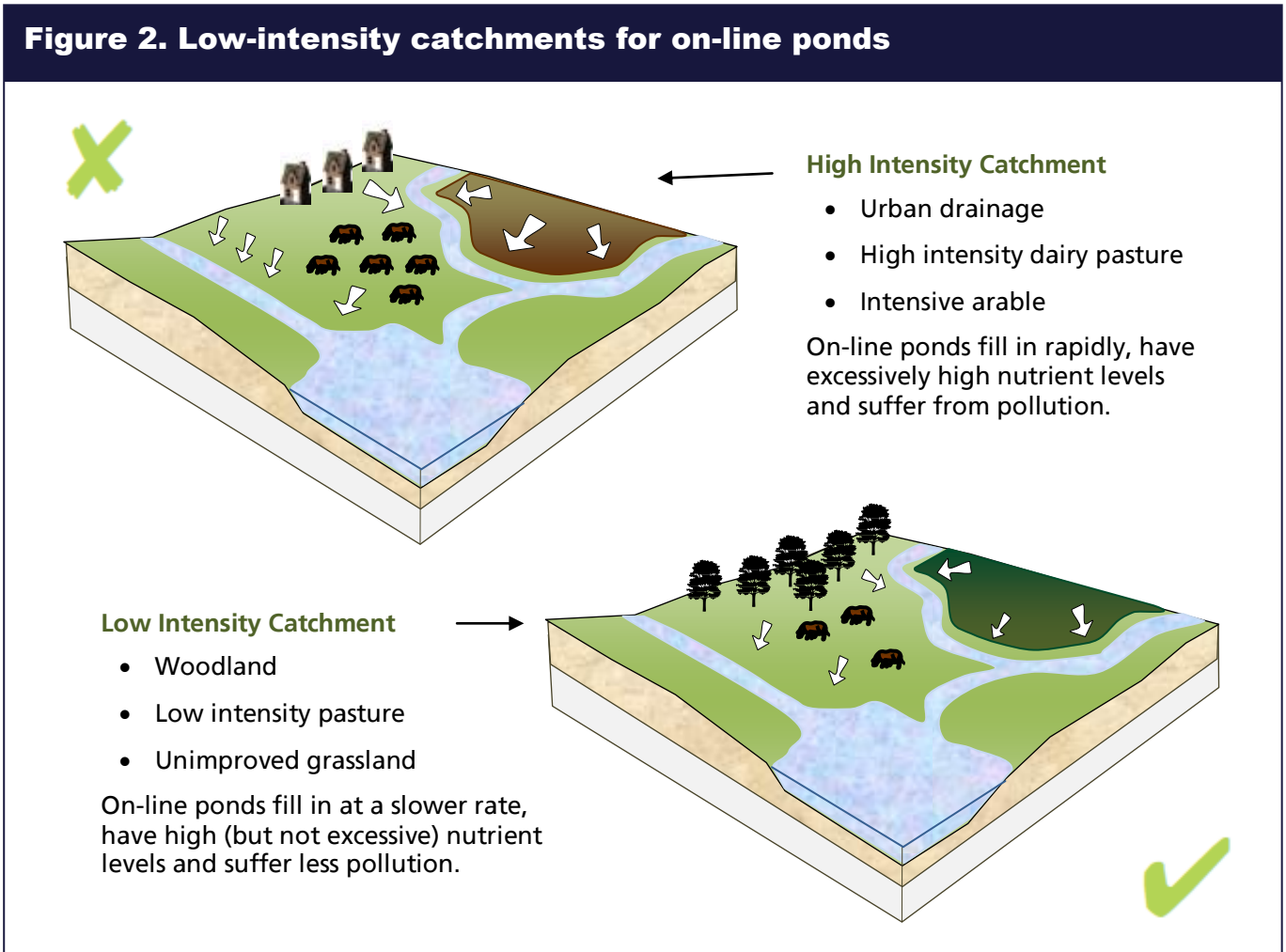


**Water source**

- Create ponds on non-acidic substrates because the Crystal Moss Animal colonies grow better in slightly alkaline waters.
- The Crystal moss animal is associated with *naturally* eutrophic waters so create on-line ponds in predominantly low intensity catchments (e.g. woodland and low intensity grassland) to achieve the correct balance between nutrient inputs and water flow (Figure 2).

N.B. The Crystal Moss Animal is an exception in that it is one of the only pond-associated BAP species for which relatively poor water quality may not be an issue, unless it affects the availability of substrate, i.e. plants on which to attached itself. See [Pond Creation Toolkit Factsheet 2](#) for further information on the importance of clean water for freshwater wildlife.

**Figure 2. Low-intensity catchments for on-line ponds**



### ***Pond location***

- Ponds will be more easily colonised by the Crystal Moss Animal if they are in a river or stream catchment with an existing population. The species can reproduce sexually through short-lived free-swimming stages but this is probably rare. It is more likely to reproduce asexually by budding or by producing a seed-like resting stage called a statoblast (Box 1). The Crystal Moss Animal can disperse at the statoblast stage, either floating downstream or it may be digested and transported by birds.
- A supply of anchorage sites should be maintained. The Crystal Moss Animal is often found on rocks, bricks and branches on the bottom of streams. Colonies may also grow on emergent vegetation. If natural debris is not readily available then synthetic materials can be used as a substitute.
- Colonies were thought to prefer shaded waters, where there may be a greater supply of woody debris. In more open sites they tend to grow on the underside of objects. Historically, in the Norfolk Broads, the Crystal Moss Animal was associated with emergent vegetation, but now that these populations are gone, most British colonies are found on non-living substrates.

### ***Pond design***

- The Crystal Moss Animal is a filter-feeder, so it needs running water to deliver its food source. Ponds fed by springs or streams with an inflow and an outflow are preferred (Figure 3). Widening stream sections may be the easiest way to create ponds for this species.
- The size and shape of the pond may not itself be critical, colonies have been found in water bodies ranging from streams to large lakes like the Norfolk Broads. Note that larger ponds will fill less rapidly than smaller bodies of water so may provide a habitat for longer.
- The Crystal Moss Animal tends to prefer shallow water; usually less than 0.5m, but the ponds where it occurs may be up to 2m deep. Deeper ponds will take longer to fill-in if there are constant inputs of river silt.
- The banks should be shallow to encourage emergent vegetation and aquatic plants. In nutrient-rich waters, light cannot penetrate to any depth which limits plant growth, and therefore the number of attachment sites.

### ***Management***

- Maintain a supply of debris and encourage aquatic vegetation to act as anchor points for colony growth. Avoid the tendency to “clean up” ponds.
- Trees around the pond margin may be beneficial, providing some shade and acting as a supply of woody debris. But stream-fed woodland ponds will fill with sediments very rapidly therefore these ponds will need to be larger than ponds in open habitats or those which are not stream-fed.
- Monitor the pond to detect colonisation. Where this is successful consider creating a complex of online ponds to provide new habitat for colonisation.



**Figure 3.** A large pond with a broad margin of emergent vegetation - the Crystal Moss Animal is found where an inlet stream enters the pond.



## 5. Further reading

Bratton, JH. (1991) British Red Data Books: 3. Invertebrates other than Insects. JNCC, Peterborough.

Hartikainen, H., Johnes, P., Moncrieff, C. and Okamura, B. (2009) Bryozoan populations reflect nutrient enrichment and productivity gradients in rivers. *Freshwater Biology*. 54(11): 2320-2334.

Hill, SLL. (2006) The ecology and conservation of the rare freshwater bryozoan, *Lophopus crystallinus*. School of Biological Sciences. University of Reading, Reading.

Hill, SLL. and Okamura, B. (2007) Endoparasitism in colonial hosts: patterns and processes. *Parasitology*. 134:841-852.

O'Dea, A. (2002) Conservation of the freshwater bryozoan *Lophopus crystallinus*. Action for Invertebrates Report.

Okamura, B. and Hatton-Ellis, T. (1995) Population biology of bryozoans: correlates of sessile, colonial life histories in freshwater habitats. *Cellular and Molecular Life Sciences*. 51: 510-525.

Wood, TS. and Okamura, B. (2005) A key to the British and European freshwater bryozoans with ecological notes. Freshwater Biological Association, Ambleside, United Kingdom.

Wöss, EM. (1996) Life-history variation in freshwater bryozoans. Proceedings of the 10th International Bryozoology Association Conference 1995. 391-399.

**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](http://www.pondconservation.org.uk/millionponds) or email enquiries to [info@pondconservation.org.uk](mailto:info@pondconservation.org.uk)**

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This factsheet was prepared by Buglife with the advice and expertise of Dr Samantha Hill.