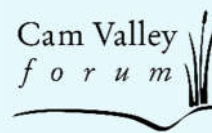


## Pennywort Pulling Seasons



*Volunteer pennywort pulling, by hand or by rake, from the bank or afloat, can be very effective part of an eradication or management programme for Floating Pennywort*

*The aim of this document is to help volunteers and those who are coordinating volunteer efforts to understand the way pennywort changes during the seasons, and so help them be most effective. It is based on advice from the Environment Agency and Cam Valley Forum's experience on the Upper Cam in 2017/18, working with volunteers and contractors aiming to eradicate Floating Pennywort from the upper Cam within 5 years.*

### **January – March: Hidden threat**



*Jan 2018*



*March 2017*

As the winter progresses, the Floating Pennywort will start to lose its leaves and the mats will steadily become thinner, particularly where they are exposed to successive hard frosts.

However even if there are no leaves visible, the strands will still be present just below the water surface. Small pieces will be mixed in with other debris, ready to regrow when the water warms up.

It's valuable to remove Pennywort before it breaks up and spreads, but the problem at this time of year is that if the strands have no leaves on, they are hard to spot amongst the other winter debris. The strands are also quite brittle, so they very readily break up and spread. Cold water is also potentially hazardous, so anyone doing pennywort pulling at this time of year needs to be aware of the dangers and take appropriate precautions.

During winter floods, the fast moving current will shred the pennywort and wash it downstream. This is pennywort's main method of spreading itself. It can seem an attractive way of getting rid of it (if you're upstream) or an unwelcome addition (if you're downstream). However the strands will catch on anything in their way, and lodge there, ready to start new colonies in the spring. The more trees and bushes there are drooping into the water, the more pennywort gets trapped.

High water levels will push pennywort strands high up into ditches where they may take root in the mud later in the year. When water levels are low, strands may get trapped by branches below the normal water level, ready to grow upwards as the water warms up and the light increases. Strong winds may also blow pennywort upstream into unexpected places.

By March the visible pennywort extent will be at its minimum, so it is dangerously easy to be complacent.

## April - June: Emergence



*April*

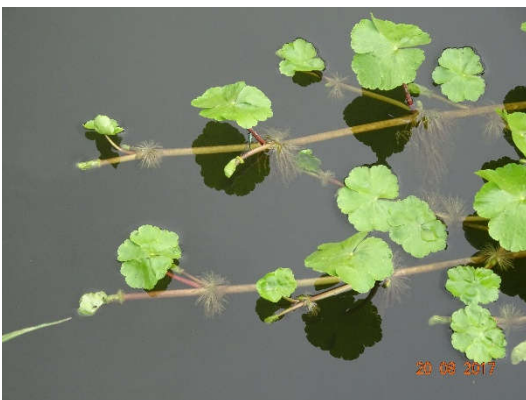
*April*

The pennywort strands sprout small bright green leaves, strengthen and grow. This is the key season for volunteer efforts to eradicate it, because the leaves are easily visible, but the strands are still small and their removal makes a big difference. If left, even a 1cm strand in a favourable position (with sun, warmth and nitrates in the water) will grow into a 10m wide mat by December. If left undisturbed in shallow mud, the strands may take root.

At this time of year the water and the days are warming up, so pennywort pulling becomes pleasant and strangely satisfying.

As the pennywort is growing rapidly, Glyphosate can also be used, but only by operators with a license from the Environment Agency and with the adjuvant Topfilm. It needs repeated applications to be effective.

## July - September: Growth



*August* © Mike Foley

*August*

Pennywort growth rates accelerate, and the strands get longer and stronger, forming broader and deeper mats. The public start to notice something is going on.

It's very valuable to continue to pull out the strands, because if left each small patch will surprisingly quickly metamorphose into a monster several meters across, weighing hundreds of kilograms. Instead of the leaves lying flat in the water, mats will become multi-layered, maybe up to a meter deep.

The priority is to try to keep control; in upstream areas; places where pennywort might later block the river); and avoid the infection of sensitive habitat areas and previously uninfected areas.

## October - December: Horror



*Grantchester Mill Race October 2017*  
© Environment Agency



*Grantchester Meadows November 2017*

The pennywort mats continue growing well into November. Even in December, although the thickness of the mats starts to reduce as the temperature drops, new strands will still be spreading out sideways.

If the pennywort mats clog the full width of the river, they then trap other debris and the river quite rapidly becomes impassable.

As the winter approaches, sedges and other vegetation start to die back, releasing the mats of pennywort that had been trapped in them over the summer. These mats then start to float downstream spreading pieces as they go. If the vegetation sinks it may pull pennywort down to root in the bottom of the river.

This is the best time of year for publicity and engaging new volunteers, because the problem is very obvious. The strands are still strong, so they can be pulled out very easily. However the mats are at their maximum size and big ones will weigh far more than can be lifted by hand, so it's important to be strategic.

October can be a good time for volunteer working parties to help clean up areas ready for winter. It's most satisfying for volunteers where there is only light infestation.

It's valuable for volunteers to pull out the smaller strands anywhere, and any time, but the priority at this time of year is probably; in upstream areas; if strands are lodged in areas where they could get washed up into ditches by winter floods; if strands could infect uninfected areas; or if pennywort mats risk encroaching into places where boat traffic will break it up and spread it.

Contractors or mechanical means may be needed to remove the larger mats.

As the winter approaches, the weight of material will reduce as the leaves die back, but the strands become more brittle so harder to remove cleanly. As the water becomes colder, it's harder for volunteers to work safely. But if the pennywort mats are left in place, they will soon break up further, shedding fragments of stem that will spread the infestation further, while leaving hidden networks of stem in place to regrow even further next year....