

METHOD AIMS: To find out if Medicinal Leech: i) are present in the pond, ii) get an approximate idea of their location and abundance in the pond, and iii) collect physical data about the pond that can be used to assess the reasons for any change recorded on future visits. **Medicinal Leech are protected under the Wildlife and Countryside Act.** You will need a licence from Natural England in order to survey them. PondNet volunteers will be trained in how to search and identify Medicinal Leeches and their cocoons.

- **Equipment:** You will need; a sturdy pond net (cleaned as per the PondNet biosecurity protocols), eight sample buckets with lids (one for each sample point), a marker pen to label your buckets, a stop watch, a large plastic spoon (to scoop up leeches), and a clear plastic container with a lid (a plastic sandwich box is ideal). You will also need a camera (e.g. mobile phone camera) to take confirmatory photos, to take photos of your survey pond, and to take a photograph of your sketch maps if you don't have access to a scanner – alternatively you can give your forms to your regional officer.
- **Survey timing:** Medicinal Leech become active in May once the water is warm enough (preferably above 19°C), and will readily respond to disturbance at the pond margin in search of food. However, once they have fed, they become quite inactive, so a null response may not indicate absence. We recommend undertaking the **first visit May** and if leeches are recorded, no further visits are required. If no leeches are recorded, subsequent visits can be made in June, July and August. At the end of the season, it is possible to also search for leech cocoons amongst bankside vegetation.
- **How to survey:** Identify 8 locations around the pond perimeter where you can stand in the shallows safely. Start at the first location with one of your buckets. Splash with a pond net in the shallow water at this location for 10 mins, then wait 2 mins for the water to settle. Collect leeches as they arrive and place them in your bucket (which should contain some water and leaf litter to provide cover for your leeches). Keep the lid on the bucket (leeches can climb) and keep this bucket in the shade until the survey is completed. Label this bucket as location 1. Repeat this process at each of your 8 locations.
- **Counting the number of individuals:** Once you have collected leeches at your eight locations, you can begin to count the number of leeches you've collected in each bucket. Sampling in this way prevents double counting leeches that could swim between the different locations.
- **Confirm that you have both adults and juveniles:** Medicinal leeches are very variable in size, and can appear to be different sizes when swimming, at rest, or after they have fed. For this survey we would simply like to know whether small and large leeches are present, as an indication of whether juveniles and adults are present (i.e. a breeding population). As a guide, young swimming juveniles are generally less than 5cm, adult leeches may be up to 20cm in length.
- **Confirming identification:** Questions about identification have arisen in the past because of confusion between Medicinal Leech *H. medicinalis*, Horse Leech *Haemopsis sanguisuga*, and the Medical Leech *Hirudo verbana* (see below). To confirm the identification of your population we are asking you to photograph five of your sampled leeches. Use a large plastic spoon to place a leech in the plastic container, then take a photograph from above to capture the surface pattern and from below to capture the belly pattern.
- **Return all your leeches to the pond:** Once you've finished the survey put the leeches from each bucket *back into the location where you captured them from.*



Medicinal Leeches (Fig. 1) are impressive animals; being large (up to 20cm) and patterned. On their upper side they have a series of longitudinal red, black and yellow stripes against a dark background (these can sometimes be difficult to see on wet animals); whilst underneath their yellow belly is flecked with dark spots (to a greater or lesser extent). They will also behave in a predatory manner, heading towards disturbance in search of food, and they will bite if handled.

Horse Leeches (Fig. 2) are the most common species of large leech in the UK. They are also large (up to 16cm) but much less attractive than Medicinal Leech. Horse leech are uniformly grey or greenish in colour, with at most, a greenish yellow stripe down each side of the body. Horse Leech are not capable of drawing mammalian blood.

Medical Leeches *H. verbana* (Fig. 3) are the leeches most commonly bred in laboratories for use in medicine and research. They are not native to the UK, but are a closely related cousin of the Medicinal Leech *H. medicinalis*. The split between these two has only recently been described and we do not know the extent to which *H. verbana* may have made its way into the wild. Identification between the two is difficult because their body patterns can be very variable, although *H. verbana* may have a less speckled belly. Photographic evidence could help us re-visit some populations in the future to undertake genetic analysis.

Your name	<input style="width: 95%;" type="text"/>	Date	<input style="width: 95%;" type="text"/>
Square: 4 figure grid ref e.g. SP1243 (see your map)	<input style="width: 95%;" type="text"/>	Pond: 8 figure grid ref e.g. SP 1235 4325 (see your map)	<input style="width: 95%;" type="text"/>
Focal Pond name (if known)	<input style="width: 95%;" type="text"/>		
Determiner name (<i>optional</i> - if someone confirms the identity of the species you've recorded)	<input style="width: 95%;" type="text"/>	Voucher material (<i>tick</i>) – confirm here that you have taken photographs of your leeches	<input style="width: 95%;" type="checkbox"/>

Number of Medicinal Leech recorded in your pond

We've put a table below to help you keep track and make notes of the 8 locations where you sampled the leeches, and the number of leeches you found in each location, but for the analysis we only need a total population size category for the whole pond.

Describe each of the 8 locations where you sampled for leeches – you can upload a copy of this recording form with your results, which will help us in future surveys to sample in the same locations.	Number of leeches (record counts from each location here)
Location 1.	
Location 2.	
Location 3.	
Location 4.	
Location 5.	
Location 6.	
Location 7.	
Location 8.	
<u>Total number of Medicinal Leeches recorded in this pond (category)</u> Add together the number of leeches found at each location, to give you a total for the pond Then record the number of Medicinal Leech found in your pond using the following population size categories : 1, 2-5, 6-10, 11-20, 21-50, 51-100, 101-200, 201-500, 501-1000, 1000.	

Evidence of a breeding population of Medicinal Leech: (tick box if found)

This population includes both small (less than 5cm when swimming) and large leeches (up to 20cm in length), suggesting that both juveniles and adults were present

Medicinal Leech cocoons found: (tick box if found)

Pond searched for Medicinal Leech cocoons amongst bankside vegetation

Medicinal Leech looked for, but not found: (tick box if none found)

Note if you don't find evidence of Medicinal Leeches at the pond (either adults or cocoons, this is an important result so please still enter these findings online

Sketch map: Use this box to draw a map of your pond and indicate where you sampled eight times for medicinal leech. Also mark on this map the location of any medicinal leech cocoons (if found).

Species notes: Please add any views on pond condition for Medicinal Leech, and thoughts on why they may be abundant / declining / absent.

POND HABITAT SURVEY: This is a really important part of the survey at your focal pond. Please complete this Pond Habitat Survey for your focal pond, whether or not you find Medicinal Leech at the site. Each variable provides information known to be linked to pond quality and community type, and can be used to investigate the reason for any change observed in the size of the Medicinal Leech population at this pond.

Is the pond new? (less than 10 yrs old) **Year of creation?** **Pond Altitude**
yes, no, unknown *date, decade, unknown* (m)

Pond area

 m²

Note: This is the *surface area of the pond when the water is at its highest level (usually in early spring)*. It will probably *not* be the current water level of the pond. The high water level line should be evident from wetland vegetation like rushes at the pond's outer edge. Measure by pacing (single pace = 0.8-1m) or use online maps.

Pond dries?

- 1 = Never dries**,
2 = Rarely dries: no more than 2 years in any 10 year period, or only in drought,
3 = Sometimes dries: dries between three years in ten to most years,
4 = Dries annually. Deduce pond permanence from local knowledge (e.g. landowner) and personal judgement e.g. water level at the time of the survey. Ponds that dry out annually usually have a hard base.

Overhanging trees & shrubs

% of pond overhung by trees and shrubs

% pond margin overhung to at least 1m out from the pond margin

This is an estimate of how much of the pond is *directly* overhung by trees and shrubs, i.e. that would be shaded if the sun was overhead (use the diagram (below) as a guide).

Waterfowl impact

- 1 = major
 2 = minor
 3 = none

Major = severe impact of waterfowl e.g. few or no submerged plants, water turbid, pond banks have patches where vegetation removed, feed put down; **Minor** = waterfowl present, but little impact on pond vegetation, pond still supports submerged plants and banks are not denuded of vegetation; **None** = no evidence of waterfowl impact (moorhens may be present).

Fish presence

- 1 = major
 2 = minor
 3 = possible
 4 = absent

Major = dense populations of fish known to be present; **Minor** = small numbers of Crucian Carp, goldfish or stickleback known to be present; **Possible** = no evidence of fish, but local conditions suggest that they may be present; **Absent** = no records of fish stocking and no fish revealed during survey.

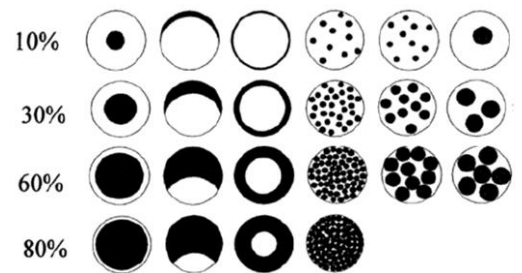
Aquatic vegetation: includes emergent, floating and submerged plants

 %

% of the whole pond (wet and dry) occupied by emergent vegetation – incl. plants like grasses, water mint and rushes, but not floating (e.g. duckweeds) or submerged (e.g. water-crowfoot) species - to see a list of emergent species look at the survey guide www.freshwaterhabitats.org.uk/projects/pondnet/survey-options/habitats

 %

% of pond water surface area covered by all vegetation (emergent, floating (excl. duckweed) and submerged).



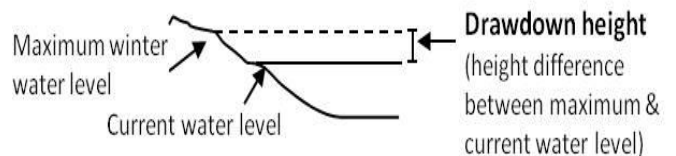
Water left in the pond

 %

% of water area in pond relative to maximum water level – This can be 0% if the pond has dried out.

 cm

Drawdown (height drop from maximum winter water level to current level).



Grazing

Tick if there is evidence the pond is grazed by livestock. If **yes** complete the following boxes:

 %

% of whole pond grazed (note: stock can wade into shallow ponds to graze).

 %

% of pond perimeter grazed (note: stock can wade into shallow ponds to graze otherwise inaccessible edges).

Grazing intensity: rank 1-5 (1=infrequent or low intensity to 5 = margins heavily poached and almost bare).

Pond management (tick):

Use the tick boxes to list management within the last 12 months. Use 'other' box for any extra info.

<input type="checkbox"/> Fully dredged	<input type="checkbox"/> Partly dredged	<input type="checkbox"/> >5% vegetation removed	<input type="checkbox"/> <5% vegetation removed
<input type="checkbox"/> Trees planted	<input type="checkbox"/> Trees clear-felled	<input type="checkbox"/> Trees cut back / coppiced	<input type="checkbox"/> Pond changed shape / size
<input type="checkbox"/> Plants introduced	<input type="checkbox"/> Bank plants mown	<input type="checkbox"/> Structural work e.g. to dam	<input type="checkbox"/> Straw added

 Add other or more detail
Turbidity / water clarity:

Estimate turbidity looking down into c.20cm depth of water in the pond.

 1 = clear; 2 = moderately clear; 3 = moderately turbid; 4 = turbid

Inflows and outflows: (tick if inflow or outflow present or leave blank)

 Inflow present Outflow present

Water chemistry:

If suitable kits and meters are available (or leave blank):

<input style="width: 70px; height: 20px;" type="text"/> pH Nitrate (NO³-N ppm): PPW kits provided by FHT (tick one from the following range categories) <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="width: 12.5%;"><small><0.2</small></td> <td style="width: 12.5%;"><small>0.2-0.5</small></td> <td style="width: 12.5%;"><small>0.5-1</small></td> <td style="width: 12.5%;"><small>1-2</small></td> <td style="width: 12.5%;"><small>2-5</small></td> <td style="width: 12.5%;"><small>5-10</small></td> <td style="width: 12.5%;"><small>10 +</small></td> </tr> <tr> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> </tr> </table>	<small><0.2</small>	<small>0.2-0.5</small>	<small>0.5-1</small>	<small>1-2</small>	<small>2-5</small>	<small>5-10</small>	<small>10 +</small>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 70px; height: 20px;" type="text"/> Conductivity (µS cm ⁻¹) Phosphate (PO₄³⁻-P ppm): PPW kits provided by FHT (tick one from the following range categories) <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="width: 12.5%;"><small><0.02</small></td> <td style="width: 12.5%;"><small>0.02-0.05</small></td> <td style="width: 12.5%;"><small>0.05-0.1</small></td> <td style="width: 12.5%;"><small>0.1-0.2</small></td> <td style="width: 12.5%;"><small>0.2-0.5</small></td> <td style="width: 12.5%;"><small>0.5-1</small></td> <td style="width: 12.5%;"><small>1 +</small></td> </tr> <tr> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> <td><input style="width: 30px; height: 15px;" type="text"/></td> </tr> </table>	<small><0.02</small>	<small>0.02-0.05</small>	<small>0.05-0.1</small>	<small>0.1-0.2</small>	<small>0.2-0.5</small>	<small>0.5-1</small>	<small>1 +</small>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>	<input style="width: 30px; height: 15px;" type="text"/>
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Pond base:

 This refers to the *geology* (i.e. rock-type) that immediately underlies the pond. You may know, or be able to see the underlying geology in the base or banks of the pond, especially in new ponds. If not, check a geology map or leave this section blank.

 Choose one of the following to categorise the % composition of **each** of pond base: 1= 0-32%, 2= 33-66%, 3= 67-100%

 Silt/ clay Sand, gravel, cobbles Hard rock Peat Other (please specify)

Surrounding land use:

 Estimate the percentage of surrounding land-use in distance zones from the pond perimeter (i.e. the maximum winter water level) used to assess pond area. In many ponds the 0-5m zone will include surrounding trees/scrub.

Habitat	0-5m	0-100m	Examples
Trees, woodland & scrub	%	%	Deciduous and coniferous woodland, individual trees, scrub and hedgerows.
Heath & moorland			Lowland and upland heathland, moorland and mountain; includes bracken.
Rank vegetation			Unmanaged grass, neglected and abandoned land, set-aside, verges and buffer strips.
Unimproved grassland			Herb-rich, calcareous and acid grassland (good quality plant indicators usually present). Low percentage of agricultural grasses. Not fertilised, little or no drainage.
Semi-improved grassland			A transition category. Grasslands modified by fertilisers, drainage, herbicides or intensive grazing, but retaining elements of natural grassland types in the area.
Improved grassland			Fertile agricultural grass, often bright green and lush; including parks and golf greens.
Arable			All crops. Includes flower and fruit crops (e.g. strawberries) and ploughed land.
Urban buildings & gardens			Areas in curtilage (associated with buildings); including glass-houses and farm yards.
Roads, tracks & paths			Including car-parks and footpaths.
Rock, stone & gravel			Cliffs, rock-outcrops, gravel-pits, quarries, areas of sand and gravel or stone.
Bog, fen, marsh & flush			Wetland vegetation and blanket bog.
Ponds & lakes			Permanent and seasonal waterbodies; including trackway pools.
Streams & ditches			Rivers, streams, ditches, springs and canals
Other (state)			E.g. maritime vegetation, saltmarsh, sand-dune, orchards and railways.

 Is the pond in a protected area? (e.g. nature reserve, SSSI, etc)
 (choose one option - yes, no, unknown)

How much of pond perimeter could be surveyed? Note areas of pond not accessible.

Comments box: e.g. new ownership, changes since previous visit, any other information.