

### METHOD

**Aims:** To find out if Adder's-tongue Spearwort is i) present in the pond, ii) get an approximate idea of its location and abundance in the pond, iii) collect physical data about the pond that can be used to assess the reasons for any change recorded on future visits.

- **Equipment:** It's helpful to take a camera (e.g. mobile phone camera) to take confirmatory photos of Adder's-tongue Spearwort, to take photos of your survey pond for the record, and to take a photograph of your sketch maps if you don't have access to a scanner – alternatively you can give your survey forms to your regional officer.
- **Survey timing:** Adder's-tongue Spearwort is best identified and counted once in flower. We therefore recommend visiting the ponds at least once during the flowering season i.e. May through to the end of July.
- **Where to look:** Adder's-tongue Spearwort grows in shallow water and on wet mud at the edge of temporary pools which dry up in the summer months. Adder's-tongue Spearwort prefers areas which are poached by cattle, so any trampled trackway pools could provide suitable habitat. Adder's-tongue Spearwort is very rare and it is worth surveying all available pond habitat to determine whether any plants are present or not.
- **Survey the pond:** If Adder's-tongue Spearwort plants are found in the focal pond, count the total number of plants per pond. If there are more than 200+ plants you may want to make an estimate of the number of plants present, and record the results as an abundance category (over page). The best approach is to count the plants in a small area (e.g. 10 cm<sup>2</sup> or 1 m<sup>2</sup>), and multiply this by the area in which Adder's-tongue Spearwort plants are found. If Adder's-tongue Spearwort occurs in different densities in different parts of the pond, make separate calculations for each area, and add them to give a total (see table over page). *Note: we only need the overall total for the pond.*
- **Mark the location of plants:** Print a map to show the location of Adder's-tongue Spearwort plants within the pond. This may help you and others in the future to search the same area. Remember to fill out the pond habitat survey form for each pond surveyed.
- **Record absence:** If Adder's-tongue Spearwort is not found at the pond, please record this, and continue to fill out the environmental sheet. The findings will help identify reasons for the plant's absence from the pond.
- **Check other ponds and pools in the surrounds:** Finding out if Adder's-tongue Spearwort occurs in other nearby ponds helps us to understand the species as part of a larger population. We would like you to visit as many ponds as possible on the site each year to monitor population change.
- **Mark the location of ponds:** It will be helpful to revisit all surveyed ponds in future years. So, to ensure they can be found again by yourself or others please (a) provide an accurate grid reference and/or mark the locations on your PondNet base map, or (b) sketch a map of location of ponds, and (c) take photos. Then, upload the maps and photos to the website.

**What it looks like:** Adder's-tongue Spearwort is a rare semi-aquatic annual plant which is part of the buttercup family. It looks similar in appearance to the common Lesser Spearwort, but can be separated once plants are mature and in flower. The lower leaves of Adder's-tongue Spearwort are more or less heart shaped in appearance, whilst the leaves of Lesser Spearwort are only ever lanceolate. The flowers of Adder's-tongue Spearwort are small (5-9mm), whilst the flowers of Lesser Spearwort are large (7-25mm). Later in the season (August), once fruits have developed in place of the flowers, further confirmation is possible – Adder's-tongue Spearwort fruits are tuberculate (covered in tiny lumps) whereas the fruits of Lesser Spearwort are smooth.

We have produced a "Species Information Sheet" and "How to . . ." identification guide if you need some more hints and tips to recognise Adder's-tongue Spearwort [www.freshwaterhabitats.org.uk/projects/pondnet](http://www.freshwaterhabitats.org.uk/projects/pondnet).

Once completed, enter your results online: [www.freshwaterhabitats.org.uk/projects/waternet](http://www.freshwaterhabitats.org.uk/projects/waternet), or give your recording forms and maps to your regional project officer and we can enter the data for you.



Adder's-tongue Spearwort: (a) flowering plants incl. heart shaped lower leaves (© Sjeans, CC BY-SA 3.0, <https://commons.wikimedia.org>), (b) tuberculate fruits (© Giuliano Campus) and (c) rutted trackway pool habitat (© Richard Lansdown).

<b>Your name</b>	<input style="width: 95%;" type="text"/>	<b>Date</b>	<input style="width: 95%;" type="text"/>
<b>Square: 4 figure grid ref</b> e.g. SP1243 (see your map)	<input style="width: 95%;" type="text"/>	<b>Pond: 8 figure grid ref</b> e.g. SP 1235 4325 (see your map)	<input style="width: 95%;" type="text"/>
<b>Pond name</b> (if known)	<input style="width: 95%;" type="text"/>		
<b>Determiner name</b> ( <i>optional</i> - if someone confirms the identity of the species you've recorded)	<input style="width: 95%;" type="text"/>	<b>Voucher material</b> ( <i>optional</i> - comment if you've taken a photo to confirm identification)	<input style="width: 95%;" type="text"/>

### Number of Adder's-tongue Spearwort in the pond

Record the number of Adder's-tongue Spearwort plants found in the pond. If more than 200 plants please use the following **categories: 200-500, 501-1000, 1000-2000, 2000+**. If there are many plants, count the number in a small area and multiply up. We've put a table below to help you keep track and make notes, but for the analysis **we only need a total**.

If you find Adder's-tongue Spearwort please take a confirmatory photo. You can also take a photo of your pond or your maps (or scan them if you have a scanner) and upload them with the record.

<b>Pond habitat type or areas where the plant is found (list):</b> use this table to help with your number calculations, and so you / others can re-find plants	<b>Number of plants</b>
1.	
2.	
3.	
4.	
5.	
6.	
<b><u>Total number of Adder's-tongue Spearwort plants (category)</u></b>	

**Adder's-tongue Spearwort looked for, but not found:** (tick box if none found)

*Note if you don't find evidence of Adder's-tongue Spearwort at the pond, this is an important result so please still enter these findings online*

**Sketch map:**  
Make a sketch map of your pond (or download the image from google maps) and draw on the location of Adder's-tongue Spearwort: use shading if they covered a broad area, or x marks the spot if there are just a few plants.

Please complete a POND HABITAT SURVEY sheet at each pond surveyed.

This is a really important part of the survey at your pond. Please complete this form whether Adder's-tongue Spearwort is present or absent. Each variable provides information known to be linked to pond quality and community type, and can be used to investigate reasons for change in Adder's-tongue Spearwort occurrence. Go to:

[www.freshwaterhabitats.org.uk/projects/pondnet/survey-options/habitats](http://www.freshwaterhabitats.org.uk/projects/pondnet/survey-options/habitats) for survey guides and more information.

Is this a new pond? i.e. is pond less than 10 yrs old (choose one option - yes, no, unknown)  What year was the pond created? (unknown, exact date or nearest decade)

**Pond area**  m<sup>2</sup> **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?:** choose one option 1 = never dries, 2 = rarely dries, 3 = sometimes dries, 4 = dries annually

**Never; Rarely:** no more than 2 years in 10, or only in drought; **Sometimes:** dries between 3 years in 10 to most years; **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.

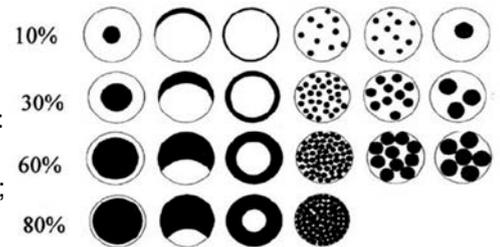
**Overhanging trees & shrubs:** This is an estimate of how much of the pond is *directly* overhung by trees and shrubs, i.e. that would be shaded if the sun was overhead (use the diagram (right) as a guide).

% of pond overhung by trees and shrubs

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

**Fish presence:** choose one option 1 = major, 2 = minor, 3 = possible, 4 = absent

**Major:** dense populations; **Minor:** small numbers of e.g. goldfish, stickleback; **Possible:** no fish seen, but local evidence suggests present; **Absent:** no records of fish stocking, no fish found during survey.



**Waterfowl impact:** choose one option: 1 = major, 2 = minor, 3 = none

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

**Area of bare ground:** Percentage of disturbance or erosion

% of the whole pond where bare ground has been created by disturbance from people/livestock should include both wet and dry areas of the pond

**Aquatic vegetation:**

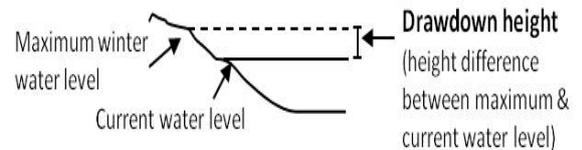
% of the whole pond (wet and dry) occupied by emergent vegetation – incl. plants like grasses, water mint and rushes, but not floating (e.g. duckweeds) or submerged (e.g. water-crowfoot) species - to see a list of emergent species look at the survey guide [www.freshwaterhabitats.org.uk/projects/pondnet/survey-options/habitats](http://www.freshwaterhabitats.org.u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

cm Drawdown (see diagram) height drop from maximum water level



**Grazing:**

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

% of whole pond grazed (note: that 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 tick boxes to list management within the last 12 months. Use 'other' box for any extra info.

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

Add other or more detail

**Water quality:**

**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)

**pH:** Take 6 readings for pH from around the pond

1      2      3      4      5      6

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**Nitrate (NO<sup>3</sup>-N ppm):** PPW kits provided by FHT  
(tick one from the following range categories)

<0.2    0.2-0.5    0.5-1    1-2    2-5    5-10    10 +

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**Conductivity (µS cm<sup>-1</sup>):** Take 6 readings for conductivity

1      2      3      4      5      6

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**Phosphate (PO<sub>4</sub><sup>3</sup>-P ppm):** PPW kits provided by FHT  
(tick one from the following range categories)

<0.02    0.02-0.05    0.05-0.1    0.1-0.2    0.2-0.5    0.5-1    1 +

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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*)

**New Zealand Pigmyweed *Crassula helmsii*:** This non-native weed may have an impact on Adder's-tongue Spearwort.

% of drawdown zone occupied by New Zealand Pigmyweed

**Identification of New Zealand Pigmyweed:**

- Can be submerged, emergent and terrestrial.
- Forms dense mats below and above the water surface.
- The flowers it has, if any at all, are very small (less than 1cm) whitish-green to slightly pink with 4 petals.
- Leaves are up to 2cm long in opposite pairs - fleshy for emergent plants, but flatter for submerged parts of the plant.
- Similar species (such as the Water-starworts) do not have fleshy leaves. Water-starworts also have a notch at the leaf tip which is absent in New Zealand Pigmyweed.



**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.