METHOD (complete one survey form per pond)

Aims: To find out if Three-lobed Water-crowfoot is i) present in the pond, ii) get an approximate idea of its 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, and iv) look in any adjacent ponds to see if Three-lobed Water-crowfoot is present or absent.

- **Equipment:** It's helpful to take a camera (e.g. mobile phone camera) to take confirmatory photos of Three-lobed Water-crowfoot, 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 post your survey forms to Freshwater Habitats Trust.
- **Survey timing:** Three-lobed Water-crowfoot is a winter/ spring flowering plant and is best surveyed between February and the end of April, before the ponds dry out and whilst the plant is still in flower.
- **Where to look:** Three-lobed Water-crowfoot grows in shallow water and on the wet mud at the edge of temporary pools which dry up in the summer months. These ponds are often trampled by grazing animals and may occur along heathland footpaths and woodland trackways used by off road vehicles. The ponds are often small and may have little other vegetation growing in them. Don't overlook these small features; survey all available pond habitat.
- **Survey the pond:** Search the pond margins and any shallow water for Three-lobed Water-crowfoot plants, and if found, *estimate the number of plants*. 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^2 or 1 m^2), and multiply this by the area in which Three-lobed Water-crowfoot plants are found. If Three-lobed Water-crowfoot 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 Three-lobed Water-crowfoot 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 Three-lobed Water-crowfoot is *not found* at the pond, please record this, and continue to fill out the pond habitat survey form. 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 Three-lobed Water-crowfoot 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.

Once completed, enter your results online: **www.freshwaterhabitats.org.uk/projects/waternet**, or email your recording forms and maps to Freshwater Habitats Trust and we can enter the data for you: **info@freshwaterhabitats.org.uk**.

What it looks like: Water-crowfoots are a tricky group to identify – even for experts. Fortunately, Three-lobed water-crowfoot is one of the more straightforward species - once you have your eye in for the right leaf shape. You can find some more hints and tips on how to recognise Three-lobed Water-crowfoot at **www.freshwaterhabitats.org.uk/projects/pondnet/survey-options**.

Three-lobed Water-crowfoot: Features are variable and hybrids are common in some areas – try to match all the features to reach a positive identification: (a) Floating leaves deeply 3-lobed, middle lobe usually narrower than lateral lobes; (b) Submerged thread-like (capillary) leaves present; (c) Small flowers (petals <5mm), Dec-April, petals similar in length or only slightly longer than the sepals.

(a) Floating leaves

(b) Submerged leaves

(c) Small white flowers

PondNet

Three-lobed Water-crowfoot (*Ranunculus tripartitus*)

RARE SPECIES RECORDING FORM (PAGE 2 of 4)

Your name		**Date**	
Square: 4 figure grid ref e.g. *SP1243* (see your map)		**Pond: 8 figure grid ref** e.g. *SP 1235 4325 (see your map)*	
Pond name (if known)			
Determiner name (*optional* - if someone confirms the identity of the species you've recorded)		**Voucher material** (*optional* - comment if you've taken a photo to confirm identification)	

If you find Three-lobed Water-crowfoot 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 www.freshwaterhabitats.org.uk/projects/waternet.

Number of Three-lobed Water-crowfoot in your pond

If there are many plants, count the number in a small area (i.e. 1m^2) 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**.

Areas where Three-lobed Water-crowfoot was found (list): use this table to help with your number calculations, and so you/others can re-find plants on future visits.	**Number of individuals**
1.	
2.	
3.	
4.	
5.	

Total number of Three-lobed Water-crowfoot (total count)
Provide a single total for the whole pond based on an actual or estimated number of plants recorded

Total number of Three-lobed Water-crowfoot (abundance category)
Then record the number of Three-lobed Water-crowfoot found in the pond using the following abundance categories:
1, 2-5, 6-10, 11-20, 21-50, 51-100, 101-200, 201-500, 501-1000, 1001-5000, 5001-10000, 10001-20000, 20001+

Three-lobed Water-crowfoot looked for, but not found
Note: if you *don't* find evidence of Three-lobed Water-crowfoot at the pond, this is an important result so please still enter these findings online (tick box if none found)

Pond sketch map: Make a sketch map of your pond and draw on the location of Three-lobed Water-crowfoot: use shading if they cover a broad area, or 'x' marks the spot if there are just a few plants.

Location map: Use this box to show the location of the pond and surrounding ponds you searched (or mark the information on the base map included in your site information pack).

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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 Three-lobed Water-crowfoot 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 Three-lobed Water-crowfoot occurrence. If you are surveying non-pond habitat – complete all variables that apply.

Go to: **www.freshwaterhabitats.org.uk/projects/pondnet/survey-options/habitats** for survey guides and more information.

Is the pond new? (less than 10 yrs old) *yes, no, unknown* [ ]

Year of creation? *date, decade, unknown* [ ]

Pond Altitude (m) [ ]

Area

[ ] m^2

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
3 = sometimes
4 = annually

1 = Never dries, **2 = Rarely dries**: no more than two years in any ten 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 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.

Disturbance by dogs

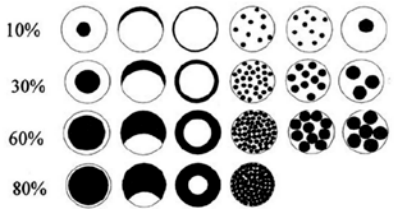
[ ]
1 = major
2 = minor
3 = none

Major = dogs repeatedly use the pond, compacted edges with little vegetation, water very turbid; **Minor** = dogs use the pond, but little impact on pond vegetation, pond still supports submerged plants and banks are not denuded of vegetation; **None** = no evidence that dogs are using the pond.

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. pondweed) or submerged (e.g. water-crowfoot) species.

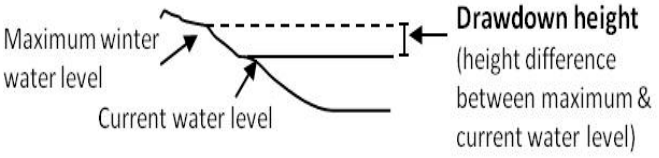
[ ] **%** % of pond water surface area covered by all vegetation (emergent, floating (excl. duckweed) and submerged).



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. The height drop from the maximum winter water level to current level (see diagram).



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 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** [ ] **Conductivity (µS cm-1)**

Nitrate (NO^{3-}-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 +

Phosphate (PO_4^{3-}-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 +

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 this species.

[ ] % 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.

Other invasive non-native species:
(tick all that apply)

[ ] Floating Pennywort *Hydrocotyle ranunculoides*

[ ] Non-native Pondweed, e.g.:
Canadian Pondweed *Ellodea canadensis*,
Nuttall's Pondweed *Elodea nutallii*,
Curly Waterweed *Lagarosiphon major*

[ ] Parrot's Feather *Myriophyllum aquaticum*

[ ] Water Fern *Azolla filiculoides*

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 about the pond or survey species.