METHOD

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, 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 give your survey forms to your regional officer.
- **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 Focal Pond (PondNet):** PondNet surveys are based on the random selection of a single pond known to support Three-lobed Water-crowfoot. We call this pond the ***Focal Pond***. We identify and survey the focal pond so that we can make repeat visits to the same pond over time and track change in species abundance. It is important not to change the focal pond, because this will affect the results; and could give us a false picture of how the plant is doing.
- **Survey all the ponds (Flagship Pond Site):** Flagship Pond Sites are some of the best pond sites in the UK, notable because they support populations of rare plants and insects. At Flagship Sites known to support Three-lobed Water-crowfoot, we want to do a full survey of all the ponds, to help inform the management of the site. In other words, treat every pond at a Flagship Site as if it's a Focal Pond.
- **How to survey the Focal Pond:** Search the focal pond margins and any shallow water for Three-lobed Water-crowfoot plants, and if found, *estimate the number of plants* (see below). Draw a sketch map to show *the location of Three-lobed Water-crowfoot within the focal pond* – this may help you and others in the future to search the same area. *Fill out the pond habitat survey form* for the focal pond.
- **How to estimate abundance in the focal pond:** If Three-lobed Water-crowfoot plants are found in the focal pond, make an estimate of the number of plants present, and record the results as an abundance category (over page). It can be hard to count the number of plants, especially if they are closely growing or very numerous. 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 areas or habitats in 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.***

  If Three-lobed Water-crowfoot is **not found** at the pond, please record this, and continue to fill out the environmental sheet and search other ponds in the surrounds. 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 if the species is part of a larger population, which may be important for its survival. Visit as many nearby ponds or pools to see if Three-lobed Water-crowfoot is present. You don't need to record plant abundance, or environmental data at these other ponds (unless you are on a Flagship Pond Site (see note above)).

  It will be helpful to revisit these other 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) make a sketch of the location of ponds around the focal pond and (c) take photos. Then, upload the maps and photos to the website.

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. We have produced a "Species Information Sheet" and "How to . . ." identification guide if you need some more hints and tips to recognise Three-lobed Water-crowfoot **www.freshwaterhabitats.org.uk/projects/pondnet.**

Once completed, enter your results online: **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.

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 (and other surveyors)		**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, or mark on a map)			
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)	

Number of Three-lobed Water-crowfoot plants in your Focal Pond

Record the number of Three-lobed Water-crowfoot plants found in the focal pond using the following **categories**:
1, 2-5, 6-10, 11-20, 21-50, 51-100, 101-200, 201-500, 501-1000, 1000+. 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 Three-lobed Water-crowfoot please take a confirmatory photo, especially if it's the first time the pond has been surveyed for PondNet. 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.

Pond habitat type or areas where the plant is found (list): use this table to help with your number calculations, and so you/others can re-find plants	**Number of plants**
1.	
2.	
3.	
4.	
Total number of Three-lobed Water-crowfoot plants (category)	

Three-lobed Water-crowfoot looked for, but not found: (tick box if none 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.

Species notes: Please add any views on pond condition for Three-lobed Water-crowfoot, and thoughts on why it may be abundant / declining / absent.

Search other ponds and pools in the surrounds

Please search other ponds or pools in the area to see if Three-lobed Water-crowfoot is present or absent. Then complete the following summary questions about the additional pond search.
To help re-find these other pools: (a) mark their locations on your PondNet base map (in your site information pack) and indicate whether Three-lobed Water-crowfoot was present or absent.

1. Was Three-lobed Water-crowfoot found in any additional ponds?

Yes No (tick)

2. How many additional ponds did you search (if no other ponds were searched put a zero in both these boxes)?

Number of additional ponds with a positive record for Three-lobed Water-crowfoot. Excluding the focal pond, how many other ponds ***had*** Three-lobed Water-crowfoot?

Number of additional ponds with a negative record for Three-lobed Water-crowfoot. Excluding the focal pond, how many other ponds ***did not have*** Three-lobed Water-crowfoot?

Sketch map: Use this box to show the location of Three-lobed Water-crowfoot plants in your focal pond. Use shading if they covered a broad area, or x marks the spot if there were just a few plants.

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FOCAL 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 Three-lobed Water-crowfoot 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 change in Three-lobed Water-crowfoot occurrence.

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

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

Pond Altitude (m) [ ]

Pond 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 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

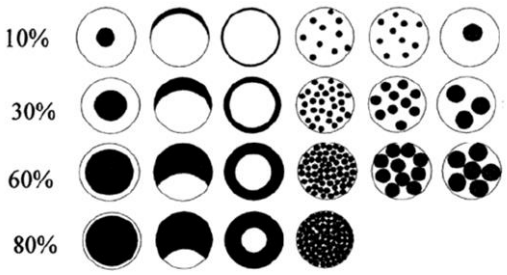
[ ]
1 = major
2 = minor
3 = possible
4 = absent

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**

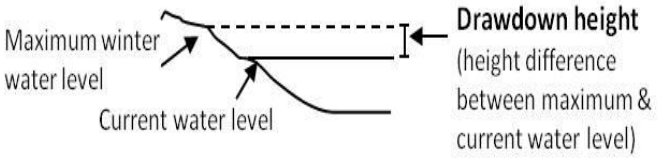
[ ] **%** % of pond water surface area covered by all vegetation (emergent, floating (excl. duckweed) and submerged).



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.

☐ 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 chemistry: Complete this section 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 +

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**

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.