

**METHOD** (complete one survey form per pond)

**Aims:** To find and map Water Violet on the sites where it occurs and record a measure of abundance at each pond. You should visit as many ponds on the site as possible. The aim is to find out whether Water Violet is i) present in the pond, ii) to 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 Water Violet is present or absent.

- **Equipment:** A pair of binoculars will help you to make an accurate estimate of the abundance. It's also helpful to take a camera to take confirmatory photos of Water Violet, 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:** Water Violet is a perennial aquatic plant which is best surveyed between May and June when in flower.
- **Where to look:** Water Violet grows in deep water (c.1.5m deep) as well as around the pond edges – its submerged leaves are an excellent habitat for pond invertebrates. Search for Water Violet in all areas of the pond, wet and dry.
- **Survey the pond:** Search the pond for Water Violet and if found, estimate the area occupied by the plants and count the number of flower spikes (see below). Draw a sketch map to show the location of Water Violet within the pond – this may help you and others in the future to search the same area. Fill out the pond habitat survey form for the pond.
- **How to estimate abundance:** We are interested in the number of flower spikes which could produce seed at the end of the season, but the area of Water Violet is also important for monitoring abundance. Abundance therefore needs to be an **estimate of plant cover, and a count of the number of flower spikes.**
- **Map the location of Water Violet:** Map the location of ponds, and the extent of Water Violet in each pond, (a) provide an accurate grid reference for each pond (8 or 10 figure grid reference) and/or mark pond locations on a base map of the site, (b) make a sketch of the ponds and mark on the location of individual Water Violet plants and/or the area of the pond covered by plants and (c) take lots of photos!
- **If Water Violet is not found at the pond:** please record this, and continue to fill out the pond habitat survey form and search other ponds in the surrounds. The findings will help identify reasons for the plant's absence from the pond.

**Measurement 1. Area covered by Water Violet:** The aim is to record the total **area** of the Water Violet growing in the pond (in m<sup>2</sup>). To do this, record the size of each patch of plants, e.g. (1m x 1m) + (1m x 2m) = 3m<sup>2</sup>. It can help to record a number of patches by imagining them grouped together to make a square or rectangle. **Note: We only need to know the total area of Water Violet to monitor the pond,** but the space overleaf can help you to add up the different patches.

Group-up small patches to make them easier to record



Water Violet may occur at very different **densities** in each patch: sometimes growing close together, and at other sites more widely separated. You need to standardise the density. To do this imagine more sparsely growing plants are pushed together to grow at their maximum natural density.

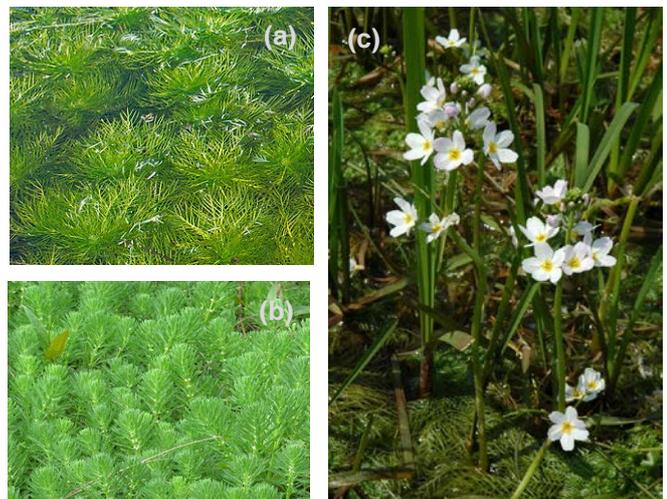
**Measurement 2. Count of the number of flower spikes:** Count the number of flower spikes seen from the pond surface. You may find plants growing in different patches around the pond, use the table (overleaf) to keep track.

**Once completed, enter your results online:** [www.freshwaterhabitats.org.uk/projects/waternet](http://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](mailto:info@freshwaterhabitats.org.uk).

**Identifying Water Violet:** Water Violets were once a common sight in the countryside, but declines in the quantity and quality of pond habitats has resulted in significant and worrying declines.

Water Violet is a distinctive plant with dense submerged leaves and aerial flower spikes. The whorled leaves are 'feather-like' i.e. they are divided multiple times and look more like combs than leaves (a). They are mostly found completely submerged, however, you can find leaves floating on the water's surface or collapsed on bare mud when the water level is low. By contrast, the feathery leaves of the non-native Parrot's Feather *Myriophyllum aquaticum* are rigid and stand upright above the water (b).

The flower spikes (c) are up to 40cm and have whorls of white to pale pink flowers with a 'yellow-eye' at the centre. Each flower has 5 petals, which distinguishes them from the 3 petals per flower found in the water-plantains *Alisma* spp.



<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> (you can relate this to the map of your site 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"/>

If you find Water Violet 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](http://www.freshwaterhabitats.org.uk/projects/waternet).

### Abundance of Water Violet in your pond

Record the area of Water Violet plants and the number of flower spikes from the whole pond, not just the water area, i.e. include areas in the drawdown zone that would be wet in winter, but may be dry in summer. If there are several different patches of Water Violet in the same pond, use the table below to record the abundance in a small area and add them up - for the analysis **we only need a total**.

Areas where Water Violet was found (list): use this table to help with your area calculations, and so you/others can re-find plants on future visits.	Area of Water Violet (m <sup>2</sup> )	Number of flower spikes (count)
1.		
2.		
3.		
4.		
5.		

**Total area covered by Water Violet plants (m<sup>2</sup>)**

Provide a single total for the whole pond based on an actual or estimated area of plants recorded

**Total number of flower spikes (total count)**

Provide a single total for the whole pond based on an actual or estimated number of flower spikes recorded

**Total number of flower spikes (abundance category)**

Then, record the number of flower spikes 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+**

**Water Violet looked for, but not found**

Note: if you *don't* find evidence of Water Violet 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 Water Violet: use shading if it covers 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).

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

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 the pond new? (less than 10 yrs old)  
yes, no, unknown

Year of creation?  
date, decade, unknown

Pond Altitude  
(m)

**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?**


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.

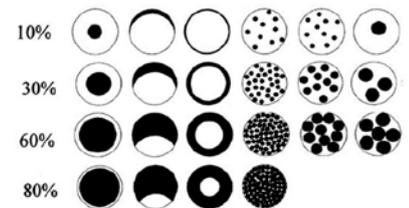
**Aquatic vegetation:** includes emergent, floating and submerged plants

 %

% 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.

 %

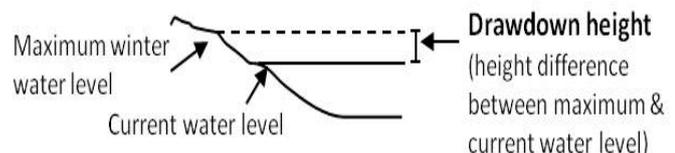
% of pond water surface area covered by all vegetation (emergent, floating (excl. duckweed) and submerged).


**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 ( $\mu\text{S cm}^{-1}$ )

**Nitrate ( $\text{NO}_3^-$ -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 +

<input type="text"/>						
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**Phosphate ( $\text{PO}_4^{3-}$ -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 +

<input 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)

**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)

Parrot's Feather *Myriophyllum aquaticum*  Floating Pennywort *Hydrocotyle ranunculoides*  Non-native Pondweed, e.g.: Canadian Pondweed *Elodea canadensis*, Nuttall's Pondweed *Elodea nuttallii*, Curly Waterweed *Lagarosiphon major*

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

<input type="text"/>
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**Comments box:** e.g. new ownership, changes since previous visit, any other information about the pond or survey species.

<input type="text"/>
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