

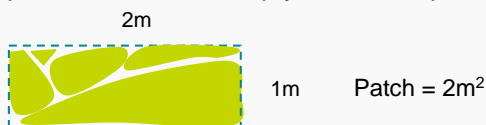
METHOD (complete one survey form per pond)

Aims: To find and map Tassel Stonewort 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 Tassel Stonewort 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 Tassel Stonewort is present or absent.

- **Equipment:** It's helpful to take a camera (e.g. mobile phone camera) to take confirmatory photos of Tassel Stonewort, 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:** Tassel Stonewort is best surveyed in the spring, between April and May.
- **Survey the pond:** Search the pond for Tassel Stonewort and if found, *estimate the area occupied by the plants and count the number of tassels* (see below). Draw a sketch map to show *the location of Tassel Stonewort 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 focal pond.
- **How to estimate abundance:** We are interested in the number of mature 'tassels' which will produce spores at the end of the season, but the area of Tassel Stonewort is also useful for monitoring abundance. Abundance therefore needs to be an **estimate of plant cover, and a count of the number of mature tassels**.
- **Map the location of Tassel Stonewort:** Map the location of ponds, and the extent of Tassel Stonewort 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 Tassel Stonewort plants and/or the area of the pond covered by plants and (c) take lots of photos!
- **If Tassel Stonewort 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.

Measurement 1. Area covered by Tassel Stonewort: The aim is to record the total **area** of the Tassel Stonewort growing in the pond (in m²). To do this, record the size of each patch of plants, e.g. (1m x 1m) + (1m x 2m) = 3m². 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 Tassel Stonewort 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



Tassel Stonewort *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 'tassels': Count the number of tassels seen from the pond surface, without disturbing the water. You may find plants growing in different patches around the pond, use the table overleaf to keep track. The tassels develop fairly slowly, they are initially loose and difficult to discern, becoming denser and more obvious as they mature. Please record the number of tassels that are dense, and therefore mature.

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.

Identifying Tassel Stonewort: Stoneworts are a difficult group to identify with confidence. To take part in PondNet or to survey Tassel Stonewort at a Flagship Pond Site you will need to attend one of our training sessions.

Tassel Stonewort is a freshwater green algae growing up to 40cm in shallow water. It typically grows in dense clumps with multiple plants growing amongst each other. Tassel Stonewort is yellowish-green in colour, and is often encrusted with chalky deposits giving it a crusty feel.

Tassel Stonewort, like other *Tolypella*, has a smooth and characteristically spine-free main stem. **The fertile 'tassels' are small and curved back on themselves forming dense heads, 'resembling 'an untidy birds' nest'.**

It differs from the more common clustered stonewort *Tolypella glomerata* by its sharply-tipped branchlets, and from great Tassel Stonewort *T. prolifera* by its smaller size (stem diameter is less than one millimetre).



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

If you find Tassel Stonewort 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.

Abundance of Tassel Stonewort in your pond

Record the area of Tassel Stonewort plants and the number of mature tassels 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 Tassel Stonewort 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 Tassel Stonewort 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 Tassel Stonewort (m²)	Number of mature 'tassels' (count)
1.		
2.		
3.		
4.		
5.		

Total area covered by Tassel Stonewort plants (m²)

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

Total number of mature tassels (total count)

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

Total number of mature tassels (abundance category)

Then, record the number of mature 'tassels' 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+

Tassel Stonewort looked for, but not found

Note: if you *don't* find evidence of Tassel Stonewort at the pond, this is an important result so please still enter these findings online (tick box if none found)

Area of bare ground

% 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

 %

Pond sketch map: Make a sketch map of your pond and draw on the location of Tassel Stonewort: 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 Tassel Stonewort 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 Tassel Stonewort 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) **Year of creation?** **Pond Altitude**
yes, no, unknown *date, decade, unknown* *(m)*

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 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.

1 = never dries
2 = rarely dries
3 = sometimes
4 = annually

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 **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).

1 = major
2 = minor
3 = none

Fish presence **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.

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

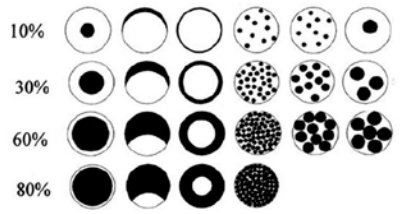
Disturbance by dogs **Major** = dogs repeatedly use the pond, compacted edges with little vegetation, water very turbid; **Minor** = dogs use the pond, but little impact on pond vegetation, pond still supports submerged plants and banks are not denuded of vegetation; **None** = no evidence that dogs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

1 = major
2 = minor
3 = none

Aquatic vegetation: includes emergent, floating and submerged plants

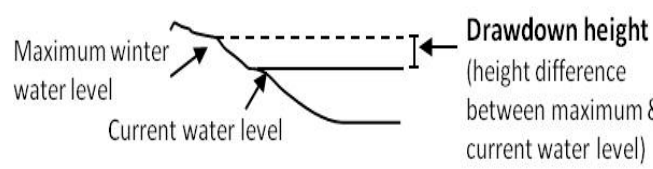
% of the whole pond (wet and dry) occupied by emergent vegetation – incl. plants like grasses, water mint and rushes, but not floating (e.g. pondweed) or submerged (e.g. water-crowfoot) species.

% 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 (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)

Parrot's Feather
Myriophyllum aquaticum

Floating Pennywort
Hydrocotyle ranunculoides

Water Fern
Azolla filiculoides

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

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.