

METHOD (complete one survey form per site)

Aims: To find out if One-grooved Diving Beetle is i) present, ii) get an approximate idea of its location and abundance, iii) collect physical data that can be used to assess the reasons for any change recorded on future visits, and iv) look in any adjacent habitat patches to see if One-grooved Diving Beetle is present or absent.

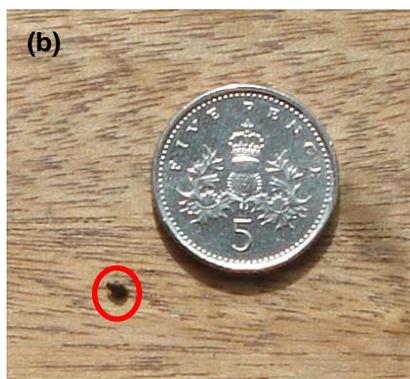
One-grooved Diving Beetle is extremely rare in the UK, having been recorded from just three ponds in the last two decades. Recent surveys at these sites have failed to find any individuals and there are fears it may now be extinct. This methodology has been developed primarily to look for One-grooved Diving Beetle on Flagship Pond sites where it was last recorded <https://freshwaterhabitats.org.uk/projects/flagship> but will also be used to look for new sites.

- **Equipment:** You will need; a sturdy pond net and a large white tray (cleaned as per the PondNet biosecurity protocols). You will also need to take a camera with a good zoom lens to take confirmatory photos of One-grooved Diving Beetle, to take photos of your survey site 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:** One-grooved Diving Beetles have been recorded throughout the year, but the peak survey window appears to be in spring, April to May.
- **Where to look:** One-grooved Diving Beetle have been recorded from a variety of ponds and pools created as a by-product of the historical mineral industry (peat and clay pits). All the sites have broad-shallow margins which are heavily poached by grazing animals. Adult One-grooved Diving Beetles have been found in these warm shallow margins.
One-grooved Diving Beetle are extremely rare. Therefore, only experienced surveyors who have discussed the survey with site managers and Natural England officers should undertake these surveys.
- **Survey the area indicated on your map:** The site will have a previous record for One-grooved Diving Beetle although they may not have been recorded for some time, or this may be a new site. Search the area indicated in your site pack for One-grooved Diving Beetle, and if found, record the number of individuals (see below), draw a sketch map to show the location of any One-grooved Diving Beetle you find, and fill out the pond habitat survey form for the pond.
- **How to survey for One-grooved Diving Beetle:** Sweep the pond net gently but firmly through the pond margin and place the collected material in the white tray with some water – the aim is to collect invertebrates but limit the amount of sediment and plant material collected. After allowing time for the material in the tray to settle, One-grooved Diving Beetle will pop to the surface for air and can be collected and identified. If One-grooved Diving Beetle occur in different areas of the pond, make separate notes for each area, and sum them to give a total! (see table over page).
- **Recording absence:** If One-grooved Diving Beetle is **not found**, please record this, and continue to fill out the pond habitat survey sheets (pages 3 and 4). The findings will help identify reasons for their absence from the pond.
- **Check other likely ponds in the surrounds:** One-grooved Diving Beetle was discovered unexpectedly at a site in the early 2000's. There is therefore a slim chance that new populations may be discovered in the future. Visit other nearby ponds with suitable habitat to find out if One-grooved Diving Beetle is present. **Complete a new form for each site searched.**

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: The One-grooved Diving beetle is an extremely rare species in the UK. It is one of our smallest water beetles, just 2mm in length, but is easily recognised on close inspection by the single furrow running from the pronotum onto each elytra;

Water beetles are a difficult group to survey and identify with confidence. To take part in PondNet or to survey One-grooved Diving Beetle at a Flagship Pond Site <https://freshwaterhabitats.org.uk/projects/flagship> you will need to attend one of our training sessions or be accompanied by an expert.



One-grooved Diving Beetle: (a) One-grooved Diving Beetle with furrow running from the pronotum onto each elytra; (b) Photograph of one-grooved Diving Beetle to give an idea of scale, and (c) One-grooved Diving Beetle habitat.



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 (<i>optional</i> - if someone confirms the identity of the species you've recorded)		Voucher material (<i>optional</i> - comment if you've taken a photo to confirm identification)	

If you find One-grooved Diving Beetle please take a confirmatory photo. You can also take a photo of your site 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 One-grooved Diving Beetles

Record the number of One-grooved Diving Beetles in each area you search, then add up your total. We've put a table below to help you keep track and make notes. For the analysis we **need the individual counts and a total**.

Areas where One-grooved Diving Beetle was found (list): use this table to record numbers and so you/others can re-find One-grooved Diving Beetle on future visits.	Number of individuals
1.	
2.	
3.	
4.	
5.	

Total number of One-grooved Diving Beetle (total count)

Provide a single total for the whole pond.

Total number of One-grooved Diving Beetle (abundance category)

Then record the number of One-grooved Diving Beetle 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+

One-grooved Diving Beetle looked for, but not found

Note: if you *don't* find evidence of One-grooved Diving Beetle at the site, this is an important result so please still enter these findings online (tick box if none found)

Area of poached ground (%)

% of the whole pond where disturbance from the feet of grazing animals created poached ground – includes both wet and dry areas of the pond.

 %

Pond sketch map: Make a sketch map of your ponds and draw on the area of poached ground and locations where One-grooved Diving Beetle (if any) were seen.

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 One-grooved Diving Beetle 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 One-grooved Diving Beetle occurrence. If you are surveying non-pond habitats – 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) <i>yes, no, unknown</i>	<input type="text"/>	Year of creation? <i>date, decade, unknown</i>	<input type="text"/>	Pond Altitude (m)	<input type="text"/>
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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

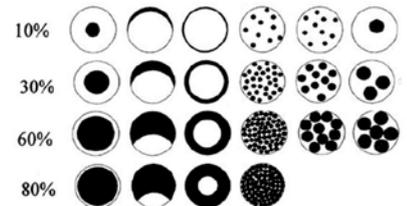
Disturbance by dogs **Major** = dogs repeatedly use the pond, compacted edges with little vegetation, water very turbid; **Minor** = dogs use the pond, but little impact on pond vegetation, pond still supports submerged plants and banks are not denuded of vegetation; **None** = no evidence that dogs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

1 = major
2 = minor
3 = none

Aquatic vegetation: includes emergent, floating and submerged plants

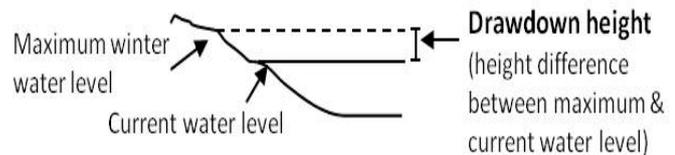
% of the whole pond (wet and dry) occupied by emergent vegetation – incl. plants like grasses, water mint and rushes, but not floating (e.g. pondweed) or submerged (e.g. water-crowfoot) species.

% 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.

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

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 +
<input type="checkbox"/>						

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 nuttallii*,
 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.