**Surveyor name(s)** *Please give full name(s) e.g. John Smith*

**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 families you've recorded)

**Voucher material** (*optional* - comment if specimens kept or photographs taken to confirm identification)

### Please complete a separate sheet for each pond surveyed

You need experience and time to do this survey. An average sized pond will take from 40 minutes to 1 hour to sample. Sorting through the pond sample to identify animals at family level will usually take between 4-6 hrs.

The aim of the survey is to assess the pond's quality based on the **invertebrate families** recorded in a **standard 3 minute sample**. Invertebrate family surveys are a monitoring tool and assess pond quality based on observed versus expected scores (Predictive System for Multimetrics (PSYM)). To understand the pond's invertebrate fauna to inform management decisions, identification to species level is more useful, but the same collection and sorting technique can be used.

#### METHOD

- Collect a 3 minute sample using a standard size pond net between May and October*

- Undertake careful bankside sorting, looking at a small batches (i.e. 5-10 second sub-samples) of netted material in a clean white tray, to identify all the invertebrate families present in the 3 minute sample – this will only produce a semi-standardised result.

- Alternatively, take the sample home and sort through the netted material a little at a time – the standardised method for PSYM.

- **Enter the results online: www.freshwaterhabitats.org.uk/projects/waternet**, or send your results to Freshwater Habitats Trust and we will enter the results for you.

- Receive an evaluation of your pond's quality, based on metrics calculated from your invertebrate survey and a suite of environmental variables which you can collect by completing a Pond Habitat Survey form (see pages 3 to 5 of this form) **www.freshwaterhabitats.org.uk/projects/pondnet/survey-options/habitats**)

#### EQUIPMENT

You will need: a standard pond net, a bucket with a lid (if sorting at home), a sorting tray, tweezers, a sample bottle (*optional -* for keeping specimens), and a guide to aquatic invertebrate families (e.g. the Freshwater Biological Association's **Guide to British Freshwater Macroinvertebrates for Biotic Assessment**).

#### STEP 1: IDENTIFY HABITATS WITHIN THE POND TO SURVEY

The aim of netting is to collect a representative and repeatable sample from the pond which includes as many invertebrate families as possible. **How:** Identify the different mesohabitats within the pond. **Mesohabitats** are different types of habitat which could support different invertebrates, e.g. stands of sedge, submerged aquatic plants, marginal grasses, areas overhung by willows, inflows, etc. An average pond could contain 3 to 8 mesohabitats. Divide your **3 minute sample** (net in water time) between the different habitats, i.e. if there are 6 habitats in the pond, net each one for 30 seconds. If the habitat is extensive you can further sub-divide, i.e. split the 30 seconds in each of the 6 habitats into three 10 second sub-samples.

#### STEP 2: COLLECT YOUR SAMPLE

Net the mesohabitat to vigorously dislodge and capture invertebrates. Lightly disturb stony or sandy substrates and sweep up any invertebrates which float out. Even very shallow water, just a few centimetres deep, can be sampled in this way. The skill is to collect animals, without collecting lots of vegetation or silt. It is worth practicing this until you are confident with your technique. Net in short bursts and empty your net frequently. A **further one-minute** can be spent searching for invertebrates on the water surface or those stuck to logs and stones.

#### STEP 3: SORT YOUR SAMPLE AND RECORD YOUR RESULTS

**Sort by the side of the pond** using a clean white tray with a small amount of water (1 cm depth) from the pond and a **walnut sized amount of material** (this could be a 5 second sub-sample or less). Discard the sorted material; fill the tray up with clean water and sort the next bit of sample. Continue in this way until the entire sample has been sorted.

To complete the standardised PSYM method; put the sample in a sealed bucket and **take it home to sort**. Don't add any water to this bucket - it will slosh around damaging animals, and allow the predators to eat all the prey! At home, sort the sample in small walnut sized batches, using tap water in your tray. It is important to sort the sample on the same day or it will rot in the bucket.

Work through the 3 minute sample, at the pond or at home, to pick out invertebrates and **identify them to family level**. NOTE: Don't count individuals; we just need to record the presence or absence of each family. Record the results on this form. Invertebrate families are scored by BMWP groups - used to calculate a PSYM score; ponds that have at least some invertebrates in higher scoring BMWP groups, tend to have better water quality than ponds dominated only by low scoring taxa. The other metrics used to calculate pond quality include the number of Coleoptera (beetle) families, and the number of dragonfly/alderfly families (Odonata/Megaloptera).

* If your pond is known to support Great Crested Newts you must take additional steps to prevent capture when undertaking an invertebrate survey. As a protected species, a licence is required to net for Great Crested Newts. However, if you avoid capturing them by using very careful pond dipping methods or timing, law enforcement bodies are unlikely to take action over occasional, inadvertent capture. In known Great Crested Newt ponds, we recommend that you only undertake an invertebrate survey in September, check your sample before you place it in the bucket to ensure that you have not captured any larvae, immature or adult newts. Return any captured newts immediately to the pond. For more information go to **www.naturalengland.org.uk/Images/ponddipping_tcm6-10858.pdf**

# INVERTEBRATE FAMILY LIST

(tick all that apply)

| Group / Family | BMWP Score | TICK IF PRESENT |
|---|---|---|
| **Alderflies** | | |
| Sialidae — *alderflies* | 4 | ☐ |
| **Beetles** | | |
| Dryopidae — *long-toed water beetles* | 5 | ☐ |
| Dytiscidae (Noteridae) — *diving beetles* | 5 | ☐ |
| Elmidae — *riffle beetles* | 5 | ☐ |
| Gyrinidae — *whirligig beetles* | 5 | ☐ |
| Haliplidae — *crawling water beetles* | 5 | ☐ |
| Hydrophilidae (Hydraenidae) — *water scavenger beetles* | 5 | ☐ |
| Hygrobiidae — *screech beetles* | 5 | ☐ |
| **Bivalves** | | |
| Unionidae — *large freshwater mussels* | 6 | ☐ |
| Sphaeriidae — *pea & orb mussels* | 3 | ☐ |
| **Bugs** | | |
| Aphelocheiridae — *a river bug* | 10 | ☐ |
| Corixidae — *lesser water boatman* | 5 | ☐ |
| Gerridae — *pond skaters* | 5 | ☐ |
| Hydrometridae — *water measurers* | 5 | ☐ |
| Mesoveliidae — *pondweed bugs* | 5 | ☐ |
| Naucoridae — *saucer bug* | 5 | ☐ |
| Nepidae — *water scorpions & water stick-insects* | 5 | ☐ |
| Notonectidae — *greater water boatman* | 5 | ☐ |
| Pleidae — *pygmy backswimmers* | 5 | ☐ |
| **Caddisflies** | | |
| Beraeidae | 10 | ☐ |
| Brachycentridae — *humpless casemakers* | 10 | ☐ |
| Goeridae | 10 | ☐ |
| Lepidostomatidae — *bizarre caddisflies* | 10 | ☐ |
| Leptoceridae — *long-horned caddisflies* | 10 | ☐ |
| Molannidae — *hood casemakers* | 10 | ☐ |
| Odontoceridae — *mortar-joint casemakers* | 10 | ☐ |
| Phryganeidae — *giant casemakers* | 10 | ☐ |
| Sericostomatidae — *bush-tailed caddisflies* | 10 | ☐ |
| Philopotamidae — *fingernet caddisflies* | 8 | ☐ |
| Psychomyiidae — *net tube caddisflies* | 8 | ☐ |
| Limnephilidae — *northern caddisflies* | 7 | ☐ |
| Polycentropodidae — *tube maker caddisflies* | 7 | ☐ |
| Rhyacophilidae (Glossomatidae) — *free-living caddis (little black caddis)* | 7 | ☐ |
| Hydroptilidae — *micro-caddisflies* | 6 | ☐ |
| Hydropsychidae — *netspinning caddisflies* | 5 | ☐ |
| **Crayfish** | | |
| Astacidae — *crayfish* | 8 | ☐ |
| **Damselflies** | | |
| Calopterygidae (Agriidae) — *demoiselles* | 8 | ☐ |
| Lestidae — *emerald damselflies* | 8 | ☐ |
| Coenagrionidae — *red & blue/black damselflies* | 6 | ☐ |
| Platycnemididae — *white-legged damselflies* | 6 | ☐ |
| **Dragonflies** | | |
| Aeshnidae — *hawker dragonflies* | 8 | ☐ |
| Cordulegasteridae — *golden-ringed dragonflies* | 8 | ☐ |
| Corduliidae — *emerald dragonflies* | 8 | ☐ |
| Gomphidae — *club-tailed dragonflies* | 8 | ☐ |
| Libellulidae — *chasers, skimmers & darters* | 8 | ☐ |
| **Flatworms** | | |
| Dendrocoelidae | 5 | ☐ |
| Planariidae (Dugesiidae) | 5 | ☐ |
| **Fly larvae** | | |
| Simuliidae — *black fly larvae* | 5 | ☐ |
| Tipulidae — *crane fly larvae* | 5 | ☐ |
| Chironomidae — *non-biting midge larvae* | 2 | ☐ |
| **Leeches** | | |
| Piscicolidae — *fish leeches* | 4 | ☐ |
| Erpobdellidae | 3 | ☐ |
| Glossiphoniidae | 3 | ☐ |
| Hirudinidae | 3 | ☐ |
| **Mayflies** | | |
| Ephemerellidae — *spiny crawler mayflies* | 10 | ☐ |
| Ephemeridae — *common burrower mayflies* | 10 | ☐ |
| Heptageniidae — *flat-headed mayflies* | 10 | ☐ |
| Leptophlebiidae — *prong-gilled mayflies* | 10 | ☐ |
| Potamanthidae — *hackle-gilled burrower mayflies* | 10 | ☐ |
| Siphlonuridae — *primitive minnow mayflies* | 10 | ☐ |
| Caenidae — *small square-gilled mayflies* | 7 | ☐ |
| Baetidae — *small minnow mayflies* | 4 | ☐ |
| **Shrimps** | | |
| Corophiidae — *mud-shrimps* | 6 | ☐ |
| Gammaridae (Crangonyctidae) — *freshwater shrimps* | 6 | ☐ |
| **Snails** | | |
| Ancylidae (Acroloxidae) — *freshwater limpets* | 6 | ☐ |
| Neritidae — *nerites* | 6 | ☐ |
| Viviparidae — *freshwater winkles* | 6 | ☐ |
| Hydrobiidae (Bithyniidae) — *freshwater mud snails* | 3 | ☐ |
| Lymnaeidae — *pond and marsh snails* | 3 | ☐ |
| Physidae — *bladder snails* | 3 | ☐ |
| Planorbidae — *ram's-horn snail* | 3 | ☐ |
| Valvatidae — *valve snails* | 3 | ☐ |
| **Stoneflies** | | |
| Capniidae — *small winter stoneflies* | 10 | ☐ |
| Chloroperlidae — *green stoneflies* | 10 | ☐ |
| Leuctridae — *rolled-winged stoneflies* | 10 | ☐ |
| Perlidae — *golden stoneflies* | 10 | ☐ |
| Perlodidae — *perlodid stoneflies* | 10 | ☐ |
| Taeniopterygidae — *winter stoneflies* | 10 | ☐ |
| Nemouridae — *spring stoneflies* | 7 | ☐ |
| **Water Slater** | | |
| Asellidae — *water hoglouse* | 3 | ☐ |
| **Worms** | | |
| Oligochaeta — *true worms* | 1 | ☐ |

**METRICS**: These will be calculated automatically when you enter data on WaterNet but you can calculate them here as well if you wish.

| Metric | |
|---|---|
| **TOTAL NUMBER OF TAXA (A)** | ☐ |
| **TOTAL BMWP SCORE (B)** | ☐ |
| **AVERAGE SCORE PER TAXA ( = B / A)** | ☐ |
| **NUMBER OF ALDERFLY, DRAGONFLY AND DAMSELFLY FAMILIES** | ☐ |
| **NUMBER OF BEETLE FAMILIES** | ☐ |

**PondNet**

> **Please complete a POND HABITAT SURVEY sheet at each pond surveyed.**
>
> **This is a really important part of the survey at your pond.** PSYM environmental variables are used to calculate pond quality. Critical PSYM metrics are indicated by a shaded box – we cannot calculate a PSYM score for the pond unless these have been submitted. Other metrics will give us a full picture of pond quality (including calculating an HSI score for Great Crested Newts).
>
> 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.
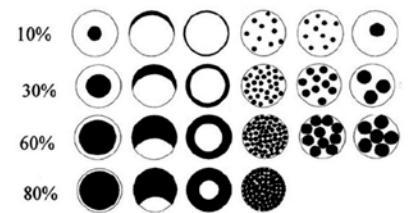
### Aquatic vegetation: includes emergent, floating and submerged plants

%

% 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).
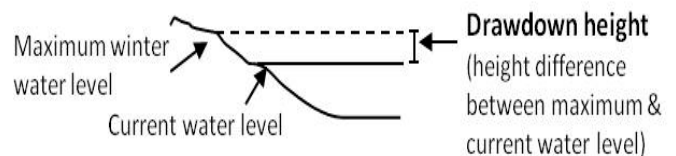
10%
30%
60%
80%

### 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).

Maximum winter water level

Current water level

Drawdown height (height difference between maximum & current water 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 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

**PondNet**

## 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*)

**Invasive non-native species:** Record any non-native invasive species you know to be present in the pond, or leave blank if you are unsure. Visit https://freshwaterhabitats.org.uk/projects/pondnet/survey-options for tips on identification (please tick all that apply).

[ ] New Zealand Pigmyweed *Crassula helmsii*

[ ] 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*

**Location score for Great Crested Newts** (select pond location based on map to right)

A (optimal), B (marginal) or C (unsuitable)

**Number of ponds:** Note: ponds are <2ha in size - to help you calculate the total use the PondNet map, an OS map, Google maps, or other mapping tool):

Number of *other* ponds (exclude the survey pond) in a *1km radius circle* centred on the pond centre. Omit ponds separated by amphibian barriers e.g. large rivers or roads.

If there are more than 12 ponds present in the 1km radius, you can just tick this box.

**Habitat quality for amphibians:** (choose one option - **1 = none, 2 = poor, 3 = moderate, 4 = good**)

**None** = clearly no suitable habitat within immediate pond locale;  **Poor** = habitat with poor structure that offers limited opportunities for foraging and shelter (e.g. amenity grassland);  **Moderate** = offers opportunities for foraging and shelter, but may not be extensive;  **Good** = extensive habitat that offers good opportunities for foraging and shelter completely surrounds pond e.g. rough grassland, scrub or woodland.

**Water quality for amphibians:** (choose one option - **1 = bad, 2 = poor, 3 = moderate, 4 = good**)

**Bad** = clearly polluted, only pollution-tolerant invertebrates, no submerged plants; **Poor** = low invertebrate diversity, few submerged plants; **Moderate** = moderate invertebrate diversity; **Good** = abundant and diverse invertebrate community, often surrounded by semi-natural land e.g. grassland, heath, woodland.

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

**Comments box:** e.g. new ownership, changes since previous visit, any other information about the pond.

**Pond sketch map:** Make a sketch map of your pond, marking on variables such as amount of shade and patches of emergent vegetation. These will help you to calculate percentage cover and provide a record of the pond which you or others can use on future visits.

**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.**