# THE CROYDON PONDS PROJECT

JANE McLAUCHLIN, MALCOLM JENNINGS and ADAM ASQUITH

TCV Croydon, Pond Cottage, Coombe Wood, Conduit Lane, Croydon CR0 5RQ
volunteer-croydon@tcv.org.uk

## ABSTRACT

Animals and plants were recorded in forty-two ponds in the London Borough of Croydon, and the results compared with our earlier survey of 1994-5.

## INTRODUCTION

Croydon's ponds were surveyed in 1994 and 1995 (McLauchlin and Jennings 1998). Since this survey, ponds have disappeared and new ponds have been created. It is in the nature of ponds to change; without management they tend to fill in and disappear (Biggs et al 1994), but they can be restored. Existing ponds and historic ponds in Croydon's parks are described and mapped in Winterman (1988), and since this date further ponds have disappeared and new ponds created.

Croydon is notable for the number of Friends of Parks groups, supported and coordinated by the London Borough of Croydon. Many of our ponds are local landmarks, and are important for their historic and ecological value. Ponds are a popular target for active conservation work to enhance the biodiversity and appearance, although over-enthusiastic management bears the risk of accidentally removing rare plants and animals, and introducing invasive species.

In 2018, TCV, The Conservation Volunteers, were awarded a Heritage Lottery Fund grant to survey the history, and the plant and animal life of Croydon's ponds. The objective of the project was to collate historic information, and use the ecological surveys to develop effective management plans for the ponds, to increase their value to wildlife, to ensure their future survival and to highlight the importance of ponds in the local environment.

## THE POND SURVEY

Forty-two ponds were surveyed, including 19 new ponds which have been created or substantially improved since 1994. There were 26 in the 1994 survey; two have since disappeared and one is at the back of a private garden and not now accessible (Table 1).

Most ponds were visited twice, one visit in each year 2018 and 2019, between June and September. Whitgift Pond, Cane Hill Pond and Beulah Hill Pond were visited once, in 2019. Plants in and around the margins were recorded. These were noted as submerged plants, floating plants and

waterside plants. Assignation between the latter two groups was in some cases problematic; depending on the water level, plants may change from growing in the water to growing on the pond surrounds. Invertebrates were sampled by dipping with a net and emptying this into a water-filled white tray. They were mostly identified to order or higher groups, or to species where we were confident with identification. The aim was to be consistent in recording to enable robust comparisons between ponds. Only presence/absence was noted, not abundance, because this will change throughout the year, and assessment would require more visits to each pond.

Counting species or groups of species gives a measure of quantity and diversity. Plants are expressed as total species "plant score", and animals as totals of groups "animal score". The OPAL Water Survey Booklet (OPAL 2015) gives a simple way to obtain a quality measure of a pond by recording a limited number of groups of animals and giving those associated with clean water a higher score than those more tolerant of pollution ("OPAL score"). Cased caddisfly larvae, dragonflies, damselflies and alderflies indicate good quality ponds and each score ten, mayflies and stoneflies, water beetles, water bugs, freshwater shrimp and hoglice each score five, and water snails and worm-like animals (worms, fly larvae, leeches, flatworms) score one.

Table 2 shows the results for both surveys. The complete very large data set with the results for all ponds will be available on the TCV project website, with general and historical information about the ponds (Asquith 2020).

Additional notes:
Source: all the ponds receive rain, and some also have road runoff or springs/streams.
Roads: whether the pond is adjacent to a road
Size: small ponds up to 8m diameter, medium ponds 9 to 20m, large ponds 30m and greater.
Shade: no = pond not shaded, part = up to 50% shade, shade = 50 – 100% shade.
Management: none = no management, occasional = up to four visits since 1995, regular = every few years or more.

## RESULTS

### PHYSICAL FACTORS AND APPEARANCE OF PONDS

This section describes the results for the 2018/2019 survey. Some physical factors about the ponds do have effects on their plants and animals, figure 1. No physical or chemical measurements of water quality were made in this survey, but factors which affect pollution might be expected to affect pond life (Williams et al 2010b). Ponds fed by springs or streams have the largest plant and animal scores, and the effect is greatest for the OPAL pond health score. However ponds near roads have higher scores than those away from

roads, perhaps because other factors are having more effect. We do not know how polluted is the road runoff and whether it reaches the pond or is removed by the road drains. Ponds near roads are conspicuous, enjoyed by local residents and may receive extra attention, more or different management and may receive more garden throw-outs.

Large ponds have higher OPAL and total plant and animal scores, although less clear results when the totals are split into groups.

Shade has large effects on organisms and the OPAL pond health score. More open ponds have more of all organisms and a much higher OPAL score. Heavily shaded ponds tend to be in woods, shallow and filled in with mud and fallen leaves. Williams et al (2010b) in their very detailed and useful guide to managing ponds, state that it is a myth that shading or drying out is disastrous for pond life, and that it is important to maintain a variety of pond types. However, their advice is based on surveys of mostly rural ponds (Williams et al 2010a). In our urban area, ponds which are allowed to dry out may disappear completely, as has Beaulieu Heights Mast B2, and Beaulieu Heights Springs B3, where the location can only be identified by some ornamental stonework buried in a patch of brambles.

Ponds which have been managed, especially if interventions have been regular, have more plants and animals (all scores). The results for ponds with no management would be even lower but for Cane Hill Pond, a new pond created in 2018 and attractively planted with a large number of native and alien plants. The results show an association but not necessarily a correlation. The other ponds with no management are mostly small, shallow and containing little water, but there is obviously potential to improve them However, more detailed surveying, before and after management, and considering the exact type of management would be necessary to disentangle the effects of “natural” arrival or re-emergence of plants and animals, and deliberate introduction. Animals are rarely deliberately introduced to ponds during management, but some will be attached to plants and others will arrive independently.

## ANIMALS AND PLANTS

Figure 1 demonstrates that the animal and plant scores are affected in the same way by the physical features of the ponds. Animal and plant scores are somewhat but not perfectly correlated, figure 2. The correlation coefficient (a statistical measure which ranges from zero for no correlation to +1 for perfect correlation or -1 for perfect negative correlation) is 0.56 for the 2018-2019 survey and 0.36 for the 1994-1995 survey.

## COMPARISONS OF PONDS IN THE NEW SURVEY

Ordering the scores for the ponds from lowest to highest highlights the ponds with the most and least plants and animals, figure 3.

The pond with the highest plant score is Heavers Meadow HM, which was not surveyed in 1994-95 when it was a wet flood-relief meadow. Now it has permanent water with a diverse population of aquatic and wetland plants, and a wet woodland mainly of willow. Other ponds with high plant scores are a mixture of established ponds which have regular management; Waddon Ponds WP and Bramley Bank BB, and new ponds, created since 1995 and with all the vegetation introduced; Wandle Park WN, South Norwood Country Park Visitor Centre N1 and Wattendon Pond WT.

Ponds with high OPAL and animal scores include Lloyd Park LP, Waddon Ponds WP, Brickfields Meadow BM, Heathfield Rockery H2 and Heathfield Round H1. These are all ponds in large parks or green open spaces with a variety of other habitats nearby. The animal scores for the new ponds with high plant scores are in the top half of ponds, confirming their association.

Poor quality ponds in terms of scores are those which held no water, so few plants and no animals were recorded from dipping: Riddlesdown chalkpit RC, Addington Hills A1 and A2, Beaulieu Heights Wood B1 and Upper Norwood UN. However, this takes no account of rare or uncommon species. The Addington Hills ponds are rare local examples of ponds on acidic soil and have Hard Fern *Blechnum spicant* (only two sites in Croydon) and two species of *Sphagnum* (three sites in Croydon), (McLauchlin and Jennings 1998).

## COMPARISONS OF THE TWO SURVEYS

Twenty-three ponds were included in both surveys. Records have not moved consistently in either direction for all ponds, which is reassuring in that there are no systematic differences either in gross effects (of the environment) or in surveying techniques between the two surveys.
The changes are illustrated in figure 4, calculated from subtracting the result from the old survey from that of the new, and placing all the results in order of magnitude. Negative bars show that the pond has declined in number of records, and positive bars that records have increased.

Ponds which stand out with large increases for OPAL and animal scores can be explained by interventions in the years between the two surveys.

Threehalfpenny Wood TH: this pond is fed by a spring which seeps out of the ground at a change in geology. Retention of water depends on a log dam which is susceptible to movement, rotting of the wood and human/canine interference. The dam has been improved with mud and stones and the pond now holds water more permanently.
Heathfield Large Pond H1: this is an artificial concrete pond which in 1994/5 was cracked and leaking. Few plants grew in the water, although tadpoles were always present each year. Now the concrete has been repaired, and earth and turf from the surrounding grass and flower beds is slowly growing into the edges of the pond.

Waddon Ponds WP: an ornamental pond in a park, fed by the River Wandle and formerly a millpond. In 1994/5 it had straight artificial banks. These have been made more natural in profile and areas have been wired off fro protection from trampling by visitors, dogs and the large resident water bird population.
Heathfield Rockery H2: an artificial pond in a rockery, and unclear why counts have increased.
Lloyd Park LP: this pond was a wet hollow fed by a spring, but has been deepened and now holds water permanently.
For plants, the Lake in South Norwood Country Park N2 was only created in the early 1990s, so was a new pond at the time of the earlier survey.
Littleheath Wood L2 was bare mud in 1994/5, but has been actively managed by the Friends Group, and is now much more vegetated,

The reasons for ponds which have declined are less clear. For OPAL and animals, Addington Hills A2 has become shaded and dry. Hamsey Green HG is overgrown with the invasive Parrot's Feather *Myriophyllum aquaticum* which may be outcompeting other species. Reasons for Whitgift Pond WH and Coulsdon Common C1 are unclear. For plants, Beulah Hill BH has become very shaded, and has lost its Friends group who were very active in the 1990s. Sanderstead Pond ST has had very robust management to control Reedmace *Typha latifolia,* and now has rather bare banks which may have reduced diversity.

## INVASIVE SPECIES

Many invasive aquatic plants reproduce or spread rapidly and can out-compete native species. Many of the new ponds have been planted with attractive and diverse mixtures of native (although not necessarily of native origin) and non-native plants. Other aliens have been deliberately or accidentally introduced to our ponds. Most add to the diversity of the pond, but some are of concern. Williams et al (2010) consider that the plant species of most concern are New Zealand Pigmyweed *Crassula helmsii*, Parrot's Feather *Myriophyllum aquaticum* and Floating Pennywort *Hydrocotyle ranunculoides*. Other species which may be invasive are shown in table 2. All these are present in a few of our ponds, but are mostly decreasing rather than causing problems. In 1994 we highlighted the presence of New Zealand Pigmyweed *Crassula helmsii* in four ponds. This has been managed with various degrees of success. A small patch in Coulsdon Common pond was immediately removed and has not recurred. It was already well-established In Bradmore Green Pond and is still present. An additional species which looks very invasive in the present survey is the American Galingale *Cyperus eragrostis* in Heavers Meadow HM. Williams et al (2010) give advice on how to remove or manage the three species of most concern, but emphasise that this is difficult once they are established. Although the other five are alien and sometimes invasive, they provide good underwater habitats in more polluted ponds where native species may not thrive. In our ponds, invasive plants are a local problem in a few ponds rather than a borough-wide issue beyond expectation of control, but

precautions should be taken during management to avoid spreading alien species.

Invasive animals were occasionally recorded. Terrapins are a familiar sight in Croydon, and during the survey we saw one and had a report from a passer-by. A headless crayfish was found at Brickfields Meadow BM, but no live specimens.

## DISCUSSION

Croydon's ponds are diverse in both their physical characteristics and in the plants and animals that live in and around them. They are a valuable part of local biodiversity because of their specialist fauna and flora which only live in these generally rather small habitats.

The results of this general survey demonstrate that there is a broad picture that the numbers and diversity of animals and plants are affected by the physical characteristics of the ponds and the extent to which they have been managed. Within this, individual ponds are extremely diverse. Species counts are not the only measure of importance of a particular pond. Some ponds, for example Addington Hills, although poor in terms of species counts, have plants which are rare in Croydon.

Surveying the entire population of ponds only every 25 years is not sufficient to keep track of changes. Some of our ponds have received no management or any formal assessment between the two surveys. We would recommend that all the ponds should be visited regularly (every year would be ideal). Detailed surveys would be ideal, but there should be at least a brief assessment of the ponds' condition, and monitoring of the wildlife using simple and quick tools such as the OPAL score of pond quality and noting the state of the plant community, especially of those species not common locally, and keeping a photographic record of the ponds. Knowledge of changes in the ponds can then be used to inform management plans, and ponds should at least be formally assessed before and after any interventions, to determine how effective these are.

Direct assessment of water quality was outside the scope of this project, but any population of ponds is likely to differ in "natural" water composition (underlying geology and the source of the water in the pond) and in local pollution affecting each pond. Chemical and physical measures of water composition are primary assessments of the state of the water, and a study of these would increase the robustness of using plant and animal scores (secondary measures) as assessments of pond quality.

Adam Asquith is the Project Officer for the TCV Croydon Ponds Project 2018-2020. Jane McLauchlin and Malcolm Jennings are TCV and ACCS (Association of Croydon Conservation Associations) volunteers.

# REFERENCES


ASQUITH, A. 2020 in preparation. The Croydon Ponds Project, history, ecology and legacy of Croydon's ponds. Available from www.tcv.org.uk/london/croydon.

BIGGS, J., CORFIELD, A., WALKER, D., WHITFIELD, M. and WILLIAMS, P. 1994. New approaches to the management of ponds. *Br. Wildlife* **5**: 273-287.

McLAUCHLIN, J. and JENNINGS, M. 1998. The flora of Croydon's ponds. *Lond. Nat*. **77**: 73-81.

OPAL (Open Air Laboratories) 2015. The OPAL water survey booklet. Available to download from www.opalexplorenature.org

WILLIAMS, P., BIGGS, J., CROWE, A., MURPHY, J., NICOLET, P., WEATHERBY, A., DUNBAR, M. 2010a *Countryside Survey: Ponds Report from 2007*. Technical Report No. 7/07 Pond Conservation and NERC.Centre for Ecology & Hydrology, 77pp. (CEH Project Number: C03259).

WILLIAMS, P., BIGGS, J., WHITFIELD, M., THORNE, A., BRYANT, S., FOX, G., and NICOLET, P., 2010b. *The Pond Book: A guide to the management and creation of ponds*. 2nd edition, Freshwater Habitats Trust, Oxford.

WINTERMAN, M. A. 1988. *Croydon's Parks, an illustrated history*. London Borough of Croydon Parks and Recreation Department.

APPENDIX TABLES AND FIGURES

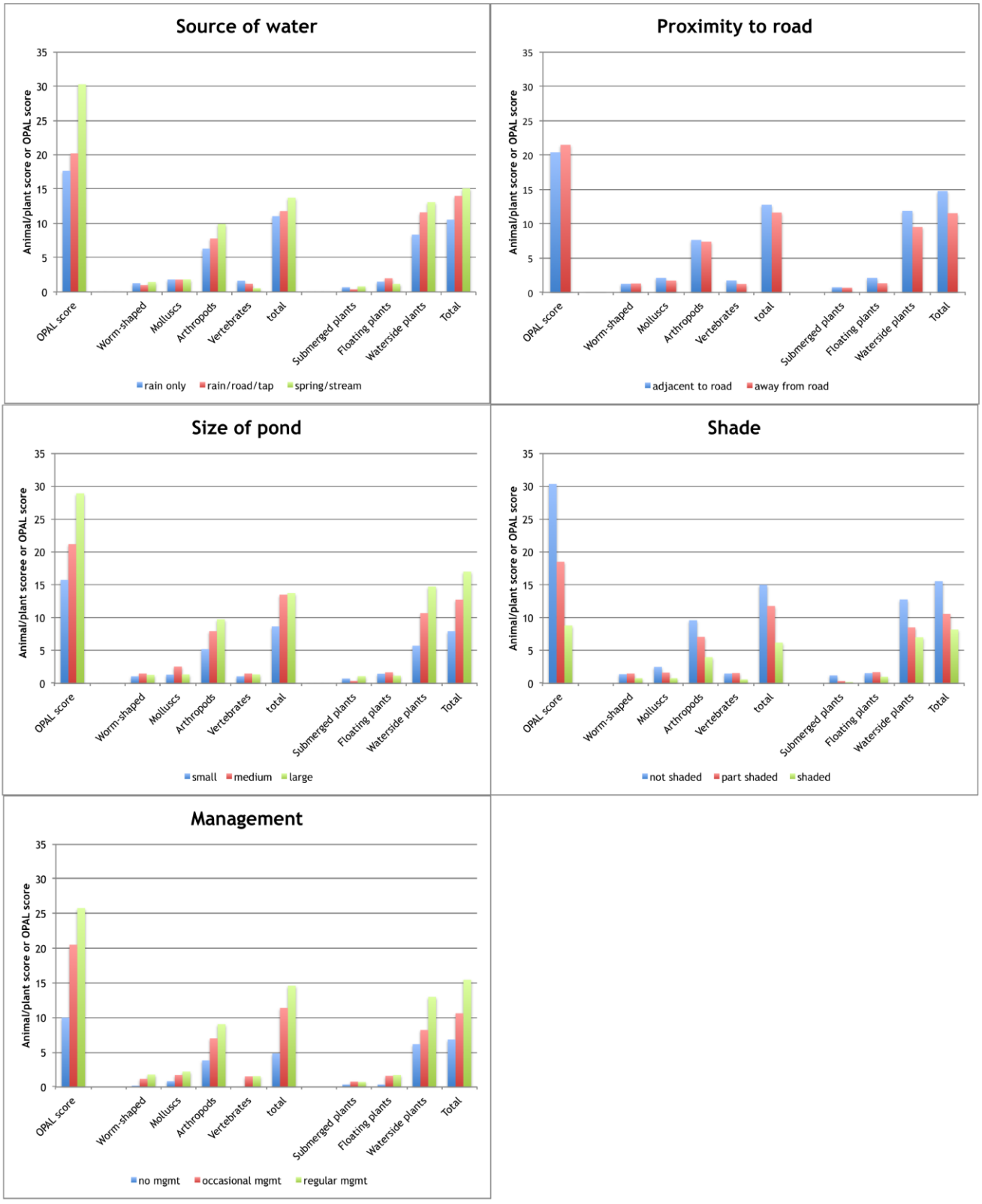


Figure 1: Physical factors and appearance of ponds

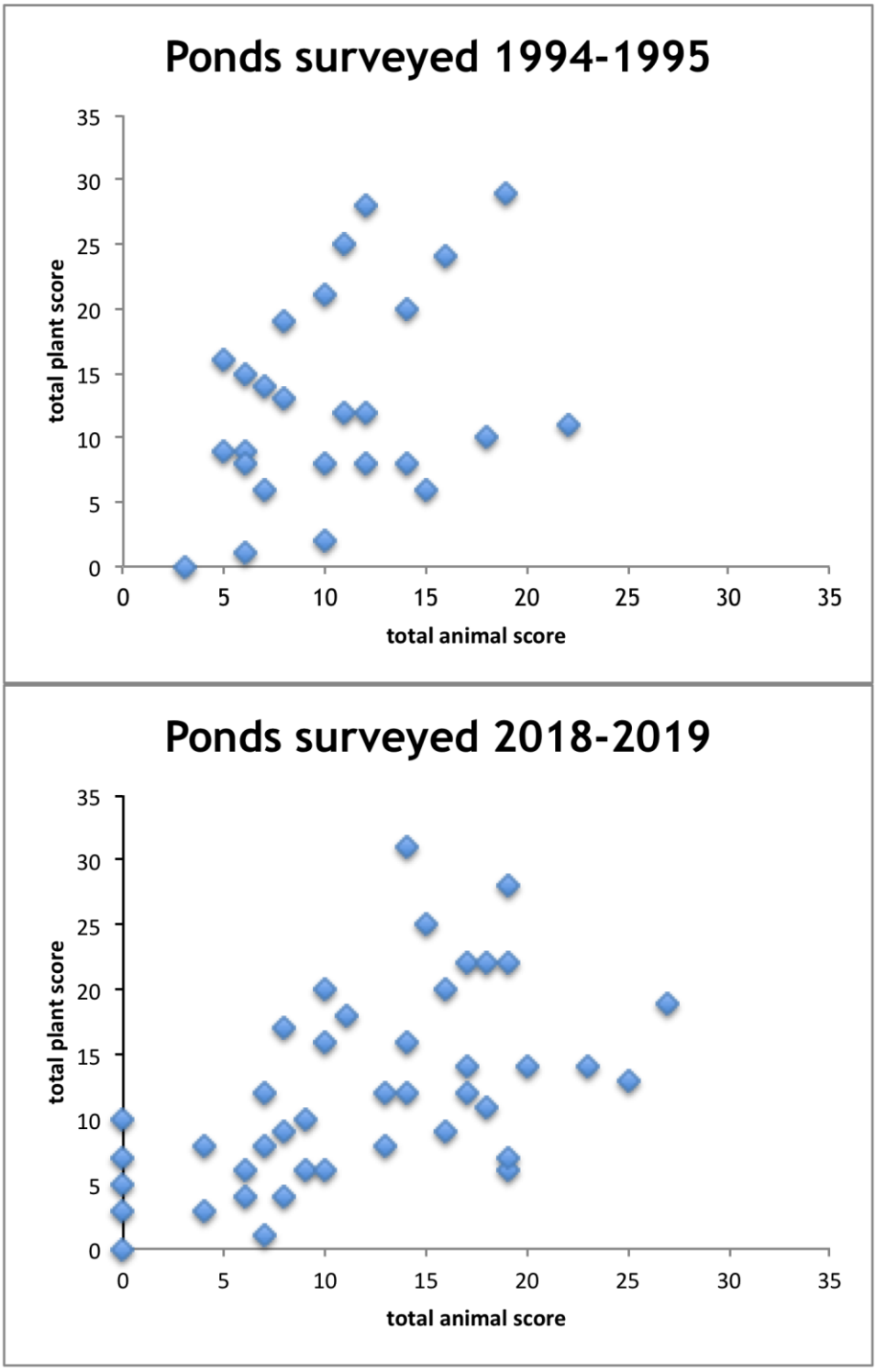


Figure 2: Correlation of total animal and total plant scores

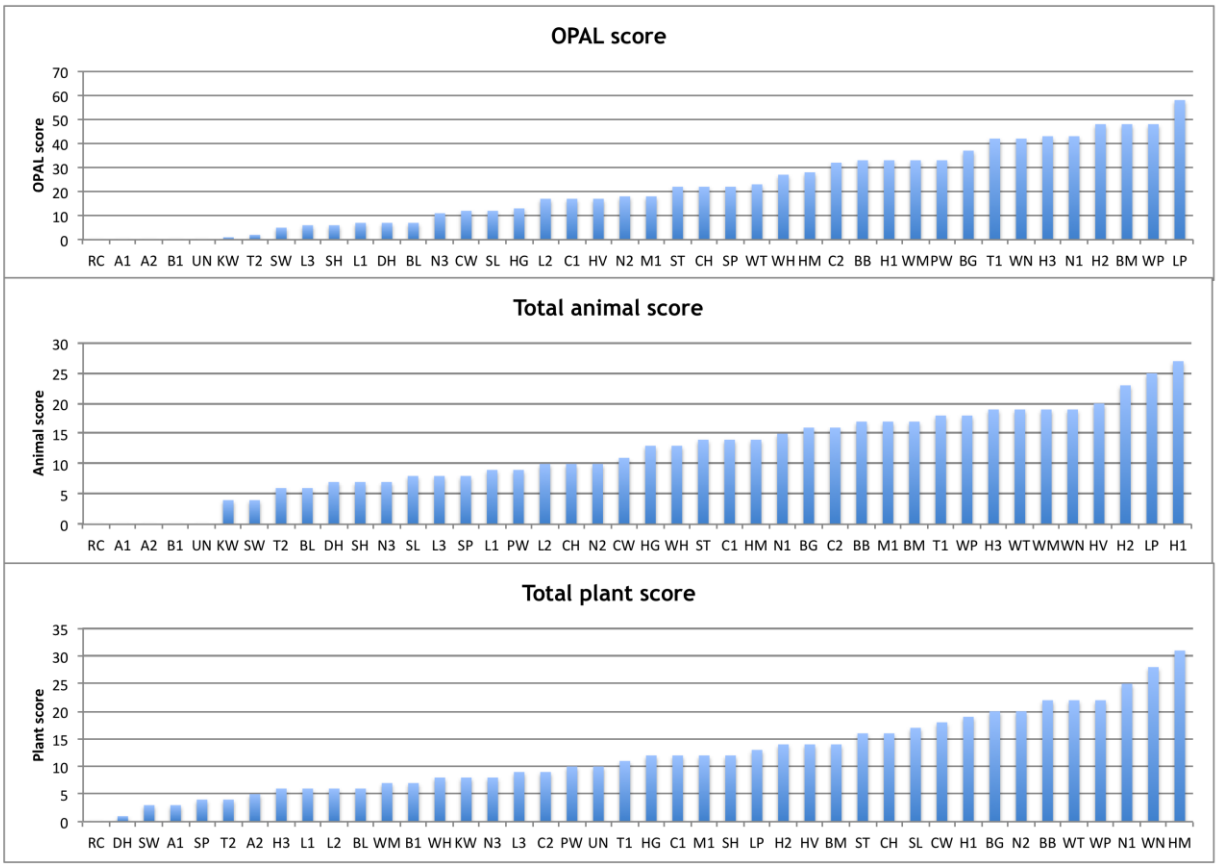


Figure 3: Comparisons of ponds (2018-2019 survey)

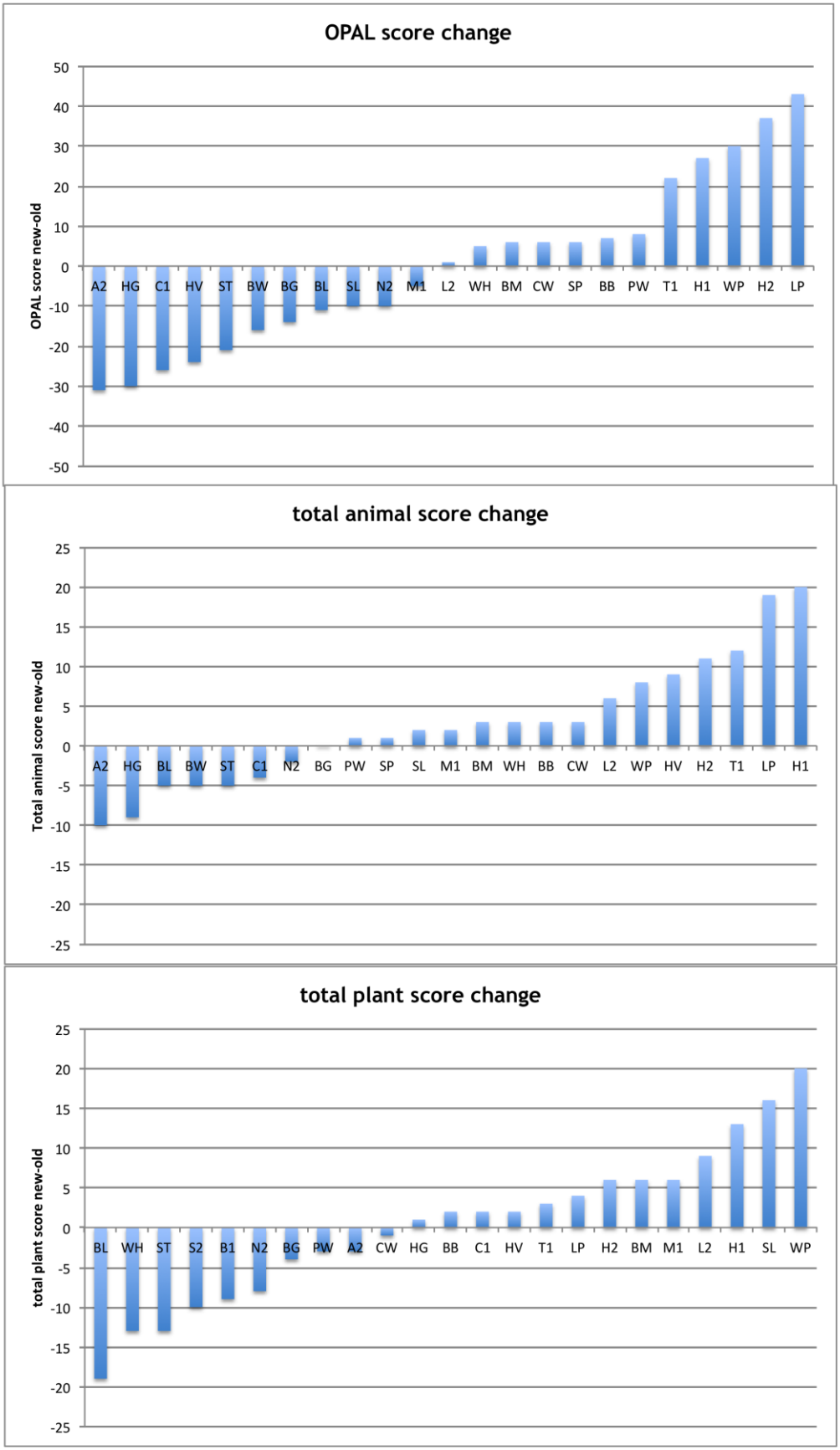


Figure 4: comparison of the two surveys

**Table 1: the ponds**

| Pond | code | recorded 1994/5 | recorded 2018/9 | size m | source | adjacent to road? | shade | status, changes since 1995 | interventions |
|---|---|---|---|---|---|---|---|---|---|
| Bramley Bank | BB | Y | Y | 30 | rain | N | part | Old pond | regular |
| Coombe Wood | CW | Y | Y | 15 | rain | Y | part | Old pond | regular |
| Hamsey Green | HG | Y | Y | 12 | rain+road | Y | part | Old pond | regular |
| Heathfield Round | H1 | Y | Y | 20 | rain | N | no | Concrete pond, repaired since 1995, holds more water and plants now colonising banks. | occasional |
| Heathfield Rockery | H2 | Y | Y | 5 | rain | N | no | Ornamental rockery pond | occasional |
| Heathfield Rectangular | H3 | N | Y | 2 x 4 | rain | N | no | Edged with slabs, plants in brick containers. | occasional |
| King's Wood | KW | N | Y | 6 | rain | N | part | New pond | occasional |
| Littleheath Woods Green | L1 | N | Y | 6 | rain | N | yes | Restored old pond in damp patch. Shaded by trees. | regular |
| Littleheath Woods Cattle | L2 | Y | Y | 12 | rain | N | yes | Old pond | regular |
| Littleheath Woods Keyhole | L3 | N | Y | 6 x 20 | rain | N | yes | Restored old pond in damp patch. Almost dry, mud. | regular |
| Sandersteead | ST | Y | Y | 30 | rain+road? +tap | Y | no | Old pond | regular |
| Bradmore Green | BG | Y | Y | 30 | rain+road | Y | no | Old pond | occasional |
| Coulsdon Common original (north) | C1 | Y | Y | 12 | rain | N | part | Old pond | occasional |
| Coulsdon Common new (south) | C2 | N | Y | 7 | rain | N | part | New pond on other side of path | occasional |
| Happy Valley (Ditches Lane) | HV | Y | Y | 9 | rain | N | part | Old pond | regular |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Riddlesdown Chalk Pit | RC | N | Y | 3 x 10 | rain | N | yes | Seasonal pond, wet in winter | occasional |
| Sanderstead to Whyteleafe | SW | N | Y | 1.5 | rain | N | no | Seasonal pond, wet in winter | none |
| Wattendon Pond | WT | N | Y | 8 | rain | Y | no | New pond with Bentonite liner | occasional |
| Dollypers Hill | DH | N | Y | 4.5 | rain | N | part | New pond with butyl liner | occasional |
| Cane Hill | CH | N | Y | 11 | rain+road | Y | no | New pond in housing development | none |
| Addington Hills E (small pond) | A1 | N | Y | 5 | rain | N | yes | Restored former pond adjacent to "old" pond. Dry, becoming overgrown. | occasional |
| Addington Hills W (large pond) | A2 | Y | Y | 10 | rain | N | part | Dry, becoming full of tree seedlings and grasses | occasional |
| Lloyd Park | LP | Y | Y | 9 | spring | N | no | Old pond | regular |
| Millers Pond | M1 | Y | Y | 60 | stream | N | part | Old pond | regular |
| *Millers Pond 2* | *M2* | *Y* | *N* | | | | | *No access, back of private garden* | |
| Shirley Heath | SH | N | Y | 2 | spring | N | yes | In 1995 was a bog without standing water. | occasional |
| Spout Hill Pond | S2 | Y | Y | 8 | spring | N | yes | Old pond | none |
| Threehalfpenny Wood The Heart | T1 | Y | Y | 12 | rain | N | part | Old pond | regular |
| Threehalfpenny Wood Mud Pond | T2 | N | Y | 10 | rain + spring? | N | yes | Restored old pond | occasional |
| Whitgift Pond | WH | Y | Y | 9 | rain | Y | part | Old pond | occasional |
| South Norwood Country Park Visitor Centre | N1 | N | Y | 6 | rain | N | no | New pond | regular |
| South Norwood Country Park Lake | N2 | Y | Y | 130 x 150 | stream | N | no | Created early 1990s | regular |
| South Norwood Country Park Lamoate | N3 | N | Y | 4.5 | rain | N | no | From development of South Norwood Country Park, early 1990s | none |
| Brickfields Meadow | BM | Y | Y | 60 x 100 | stream | N | no | Old pond | occasional |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Heavers Meadow | HM | N | Y | 10 | rain + stream | N | yes | In 1995 was a grassy flood relief area. Now has standing water with wet willow wood. | regular |
| Whitehorse Meadow | WM | N | Y | 7.5 | rain | N | no | New pond in old allotments site | regular |
| Pinewoods | PW | Y | Y | 80 x 25 | spring | N | part | Old pond | occasional |
| South Norwood Lake | SL | Y | Y | 140 x 220 | stream | N | no | Originally the reservoir for the Croydon Canal | occasional |
| Beaulieu Heights Wood | B1 | Y | Y | 5 x 10 | rain | N | yes | Old pond | occasional |
| *Beaulieu Heights by mast* | *B2* | *Y* | *N* | | | | | *Disappeared since 1995* | |
| *Beaulieu Heights springs* | *B3* | *Y* | *N* | | | | | *Disappeared since 1995* | |
| Upper Norwood Rec Ground | UN | N | Y | 6 | rain | N | no | New pond | none |
| Wandle Park | WN | N | Y | 30 x 40 | rain | N | no | New pond | regular |
| Waddon Ponds | WP | Y | Y | 40 x 200 | spring | N | no | Old pond | regular |
| Beulah Hill | BL | Y | Y | 35 x 20 | rain + road? | Y | part | Old pond | regular |

Ponds which were surveyed in 1994/5 but have now disappeared (or inaccessible for Millers Pond 2) are shown in italics.

Shade: no = pond not shaded, part = up to 50% shade, yes = 50-100% shade.
Interventions: none = no management activities, occasional = up to four visits for management since 1995, regular = every few years, or more.

**Table 2: Animal and plant records from both surveys**

| | | Bramley Bank | Coombe Wood | Hamsey Green | Heathfield Round | Hathfield Rockery | Heathfield Rectangular | King's Wood | Littleheath Woods Green | Littleheath Woods Cattle | Littleheath Woods Keyhole | Sanderstead | Bradmore Green | Coulsdon Common original (north) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **code** | **BB** | **CW** | **HG** | **H1** | **H2** | **H3** | **KW** | **L1** | **L2** | **L3** | **ST** | **BG** | **C1** |
| **2018-2019 survey** | Cased caddisfly larvae | 10 | | | | | | | | | | | | |
| | Dragonfly larvae | 10 | 10 | | | 10 | 10 | | | 10 | | | 10 | |
| | Alderfly larvae | 10 | | | | | | | | | | | | |
| | Damselfly larvae | 10 | | | | 10 | 10 | | | | | | 10 | |
| | Caseless caddisfly larvae | 10 | | | | | | | | | | | | |
| | Mayfly/stonefly larvae | 5 | | | | 5 | | | | | | | 5 | |
| | Waterbeetles and/or larvae | 5 | 5 | | 5 | 5 | 5 | | | | | 5 | | 5 |
| | Water bugs | 5 | 5 | 5 | | 5 | 5 | 5 | | | | 5 | 5 | |
| | Pond skaters | 5 | 5 | 5 | | 5 | 5 | 5 | 5 | 5 | | 5 | | 5 |
| | Water shrimps | 5 | 5 | | 5 | 5 | 5 | 5 | | | 5 | 5 | 5 | 5 |
| | Water snails | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | |
| | Water slaters | 1 | 1 | | 1 | 1 | 1 | 1 | | | | 1 | | 1 |
| | Worm-like animals | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | **OPAL pond health score** | **33** | **12** | **13** | **33** | **48** | **43** | **1** | **7** | **17** | **6** | **22** | **37** | **17** |
| | | | | | | | | | | | | | | |
| | Worm-shaped | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 |
| | Molluscs | 1 | 2 | 4 | 6 | 5 | 5 | 0 | 1 | 3 | 0 | 0 | 2 | 0 |
| | Arthropods | 11 | 5 | 7 | 14 | 14 | 11 | 1 | 3 | 6 | 5 | 10 | 10 | 9 |
| | Vertebrates | 4 | 3 | 1 | 4 | 3 | 2 | 2 | 2 | 0 | 2 | 2 | 3 | 4 |
| | **Total animal score** | **17** | **11** | **13** | **27** | **23** | **19** | **4** | **9** | **10** | **8** | **14** | **16** | **14** |
| | | | | | | | | | | | | | | |
| | Submerged plants | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| | Floating plants | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 0 | 1 | 4 | 1 |
| | Waterside plants | 18 | 15 | 10 | 16 | 10 | 3 | 5 | 4 | 4 | 9 | 15 | 14 | 11 |
| | **Total plant score** | **22** | **18** | **12** | **19** | **14** | **6** | **8** | **6** | **6** | **9** | **16** | **20** | **12** |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **code** | **BB** | **CW** | **HG** | **H1** | **H2** | | | | **L2** | | **ST** | **BG** | **C1** |
| **1994-1995 survey** | Cased caddisfly larvae | | | | | | | | | | | | 10 | |
| | Dragonfly larvae | 10 | | 10 | | | | | | | | 10 | 10 | 10 |
| | Alderfly larvae | 10 | | | | | | | | | | | | |
| | Damselfly larvae | 10 | | 10 | | | | | | | | 10 | 10 | 10 |
| | Caseless caddisfly larvae | 10 | | | | | | | | | | | | |
| | Mayfly/stonefly larvae | 5 | | 5 | | | | | | | | 5 | 5 | 5 |
| | Waterbeetles and/or larvae | 5 | | 5 | | | | | | | | 5 | 5 | |
| | Water bugs | 5 | | 5 | | 5 | | | | | | 5 | 5 | 5 |
| | Pond skaters | 5 | 5 | 5 | 5 | 5 | | | | 5 | | 5 | 5 | 5 |
| | Water shrimps | 5 | | | | | | | | | | | | 5 |
| | Water snails | 1 | | 1 | | | | | | | | 1 | | 1 |
| | Water slaters | 1 | | 1 | | | | | | | | 1 | | 1 |
| | Worm-like animals | | 1 | 1 | 1 | 1 | | | | 1 | | 1 | 1 | 1 |
| | **OPAL pond health score** | **26** | **6** | **43** | **6** | **11** | | | | **6** | | **43** | **51** | **43** |
| | | | | | | | | | | | | | | |
| | Worm-shaped | 0 | 1 | 2 | 1 | 1 | | | | 1 | | 3 | 1 | 1 |
| | Molluscs | 3 | 1 | 5 | 0 | 4 | | | | 0 | | 4 | 4 | 4 |
| | Arthropods | 7 | 3 | 11 | 2 | 2 | | | | 1 | | 9 | 8 | 11 |
| | Vertebrates | 4 | 3 | 4 | 4 | 5 | | | | 1 | | 3 | 3 | 2 |
| | **Total animal score** | **14** | **8** | **22** | **7** | **12** | | | | **3** | | **19** | **16** | **18** |
| | | | | | | | | | | | | | | |
| | | BB | CW | HG | H1 | H2 | | | | L2 | | ST | BG | C1 |
| | Submerged plants | 3 | 1 | 1 | 1 | 1 | | | | 0 | | 5 | 5 | 3 |
| | Floating plants | 6 | 1 | 3 | 2 | 3 | | | | 0 | | 9 | 6 | 3 |
| | Waterside plants | 11 | 17 | 7 | 3 | 4 | | | | 0 | | 15 | 13 | 4 |
| | **Total plant score** | **20** | **19** | **11** | **6** | **8** | | | | **0** | | **29** | **24** | **10** |

| Coulsdon Common (south) | Happy Valley (Ditches Lane) | Riddlesdown Chalk Pit | Sanderstead to Whyteleafe | Wattendon Pond | Dollypers Hill | Cane Hill | Addington Hills (small pond) | Addington Hills (larger pond) | Lloyd Park | Millers Pond 1 | Millers Pond 2 | Shirley Heath | Spout Hill Pond | Threehalfpenny Wood The Heart | Threehalfpenny Wood Mud Pond | Whitgift Pond | South Norwood Country Park Visitor Centre | South Norwood Country Park Lake |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **C2** | **HV** | **RC** | **SW** | **WT** | **DH** | **CH** | **A1** | **A2** | **LP** | **M1** | | **SH** | **SP** | **T1** | **T2** | **WH** | **N1** | **N2** |
| | | | | | | | | | 10 | | | | | | | 10 | 10 | |
| | | | | 10 | | | | | 10 | | | | | 10 | | | 10 | |
| | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | 10 | | | | | 10 | | | 10 | |
| | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | 5 | | | 5 | 5 | | | | | | | | |
| 5 | | | | | | 5 | | | 5 | 5 | | | 5 | 5 | | 5 | 5 | |
| 5 | 5 | | 5 | 5 | | 5 | | | 5 | 5 | | | 5 | 5 | | 5 | | 5 |
| 5 | 5 | | | 5 | 5 | 5 | | | 5 | | | 5 | 5 | 5 | | | | 5 |
| | 5 | | | | | | | | 5 | | | | 5 | 5 | | 5 | 5 | 5 |
| | 1 | | | 1 | 1 | 1 | | | 1 | 1 | | | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | | | 1 | | 1 | | | 1 | 1 | | | 1 | | | | 1 | 1 |
| 1 | | | | 1 | 1 | | | | 1 | 1 | | 1 | | 1 | 1 | 1 | 1 | 1 |
| **32** | **17** | **0** | **5** | **23** | **7** | **22** | **0** | **0** | **58** | **18** | | **6** | **22** | **42** | **2** | **27** | **43** | **18** |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 4 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 3 | 2 | | 1 | 0 | 3 | 1 | 2 | 2 | 1 |
| 0 | 6 | 0 | 0 | 3 | 2 | 3 | 0 | 0 | 6 | 3 | | 0 | 2 | 1 | 1 | 3 | 2 | 2 |
| 10 | 9 | 0 | 4 | 10 | 3 | 7 | 0 | 0 | 15 | 11 | | 6 | 6 | 13 | 4 | 7 | 9 | 7 |
| 3 | 1 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 1 | | 0 | 0 | 1 | 0 | 1 | 2 | 0 |
| **16** | **20** | **0** | **4** | **19** | **7** | **10** | **0** | **0** | **25** | **17** | | **7** | **8** | **18** | **6** | **13** | **15** | **10** |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 3 | 2 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 2 | 0 | | 2 | 0 | 3 | 1 | 2 | 4 | 1 |
| 5 | 12 | 0 | 2 | 16 | 0 | 14 | 3 | 5 | 10 | 11 | | 10 | 4 | 8 | 3 | 6 | 19 | 17 |
| **9** | **14** | **0** | **3** | **22** | **1** | **16** | **3** | **5** | **13** | **12** | | **12** | **4** | **11** | **4** | **8** | **25** | **20** |

| | **HV** | | | | | | | **A2** | **LP** | **M1** | **M2** | | **SP** | **T1** | | **WH** | | **N2** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | 10 |
| | 10 | | | | | | | 10 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | 10 | | | | | | | | | 10 | 10 | | | | | 10 | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 5 | | 5 | 5 | | | 5 | | | | 5 |
| | 5 | | | | | | | | | | | | 5 | 5 | | 5 | | |
| | 5 | | | | | | | 5 | 5 | 5 | 5 | | | 5 | | | | 5 |
| | 5 | | | | | | | 5 | 5 | | 5 | | 5 | 5 | | 5 | | |
| | 5 | | | | | | | 5 | 5 | | | | 5 | | | | | 5 |
| | | | | | | | | | | 1 | 1 | | | | | 1 | | 1 |
| | 1 | | | | | | | 1 | | 1 | 1 | | 1 | | | 1 | | 1 |
| | | | | | | | | | | 1 | 1 | | | | | | | 1 |
| | **41** | | | | | | | **31** | **15** | **23** | **28** | | **16** | **20** | | **22** | | **28** |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | 0 | 0 | 3 | 1 | | 0 | 0 | | 0 | | 1 |
| | 3 | | | | | | | 0 | 0 | 4 | 2 | | 1 | 0 | | 3 | | 2 |
| | 8 | | | | | | | 10 | 4 | 7 | 7 | | 4 | 6 | | 5 | | 8 |
| | 0 | | | | | | | 0 | 2 | 1 | 2 | | 2 | 0 | | 2 | | 1 |
| | **11** | | | | | | | **10** | **6** | **15** | **12** | | **7** | **6** | | **10** | | **12** |

| | HV | | | | | | | A2 | LP | M1 | M2 | | S2 | T1 | | WH | | N2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | | | | | | | 0 | 1 | 0 | 0 | | 2 | 0 | | 2 | | 0 |
| | 6 | | | | | | | 0 | 1 | 1 | 3 | | 2 | 1 | | 5 | | 1 |
| | 4 | | | | | | | 8 | 7 | 5 | 9 | | 10 | 7 | | 14 | | 27 |
| | **12** | | | | | | | **8** | **9** | **6** | **12** | | **14** | **8** | | **21** | | **28** |

| South Norwood Country Park | Brickfields Meadow | Heavers Meadow | Whitehorse Meadow | Pinewood | South Norwood Lake | Beaulieu Heights Wood | Beaulieu Heights by mast | Beaulieu Heights Springs | Upper Norwood Rec Ground | Wandle Park | Waddon Ponds | Beulah Hill |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **N3** | **BM** | **HM** | **WM** | **PW** | **SL** | **B1** | | | **UN** | **WN** | **WP** | **BL** |
| | | | | | | | | | | | 10 | |
| | 10 | | 10 | 10 | | | | | | 10 | | |
| | | | | | | | | | | | | |
| | 10 | 10 | 10 | | | | | | | 10 | 10 | |
| | | | | | | | | | | | | |
| 5 | 5 | 5 | | 5 | 5 | | | | | 5 | 5 | |
| 5 | 5 | 5 | 5 | | | | | | | 5 | 5 | |
| | 5 | | | 5 | | | | | | 5 | 5 | |
| | 5 | | 5 | 5 | | | | | | 5 | 5 | |
| | 5 | 5 | | 5 | 5 | | | | | | 5 | 5 |
| | 1 | 1 | 1 | 1 | 1 | | | | | 1 | 1 | |
| | 1 | 1 | 1 | 1 | | | | | | | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | | | | | 1 | 1 | 1 |
| **11** | **48** | **28** | **33** | **33** | **12** | **0** | | | **0** | **42** | **48** | **7** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 2 | 0 | 2 | 0 | | | 0 | 1 | 2 | 1 |
| 0 | 1 | 1 | 5 | 1 | 2 | 0 | | | 0 | 2 | 1 | 0 |
| 6 | 15 | 10 | 11 | 8 | 4 | 0 | | | 0 | 12 | 14 | 5 |
| 0 | 0 | 2 | 1 | 0 | 0 | 0 | | | 0 | 4 | 1 | 0 |
| **7** | **17** | **14** | **19** | **9** | **8** | **0** | | | **0** | **19** | **18** | **6** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 2 | 1 | 1 | 1 | | | 0 | 2 | 1 | 0 |
| 0 | 1 | 2 | 2 | 1 | 0 | 1 | | | 0 | 0 | 1 | 1 |
| 7 | 12 | 28 | 3 | 8 | 16 | 5 | | | 10 | 26 | 20 | 5 |
| **8** | **14** | **31** | **7** | **10** | **17** | **7** | | | **10** | **28** | **22** | **6** |

| | **BM** | | | **PW** | **SL** | **B1** | **B2** | **B3** | | | **WP** | **BL** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10 | | | | | | | |
| | 10 | | | 10 | | 10 | | | | | | |
| | | | | | | | | | | | | |
| | 10 | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | 5 | | | | 5 | | | | | | | |
| | 5 | | | 5 | | | 5 | 5 | | | 5 | 5 |
| | 5 | | | 5 | 5 | | | | | | 5 | 5 |
| | 5 | | | 5 | | 5 | | | | | 5 | 5 |
| | | | | | | | | | | | | |
| | 1 | | | | | 1 | 1 | 1 | | | 1 | 1 |
| | 1 | | | | 1 | | | 1 | | | 1 | 1 |
| | | | | | 1 | | 1 | | | | 1 | 1 |
| | **42** | | | **25** | **22** | **16** | **7** | **7** | | | **18** | **18** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | 0 | 1 | 0 | 1 | 0 | | | 2 | 1 |
| | 2 | | | 0 | 0 | 1 | 1 | 1 | | | 1 | 3 |
| | 9 | | | 5 | 4 | 3 | 3 | 4 | | | 6 | 7 |
| | 3 | | | 3 | 1 | 1 | 0 | 1 | | | 1 | 0 |
| | **14** | | | **8** | **6** | **5** | **5** | **6** | | | **10** | **11** |

| | BM | | | PW | SL | B1 | B2 | B3 | | | WP | BL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | | 3 | 0 | 0 | 0 | 0 | | | 0 | 6 |
| | 2 | | | 4 | 0 | 1 | 1 | 1 | | | 0 | 2 |
| | 5 | | | 6 | 1 | 15 | 8 | 14 | | | 2 | 17 |
| | **8** | | | **13** | **1** | **16** | **9** | **15** | | | **2** | **25** |

**Table 3: Invasive plants**

| plant | number of ponds recorded | |
|---|---|---|
| | **1994/95** | **2018/19** |
| *Crassula helmsii* | 4 | 2 |
| *Myriophyllum aquaticum* | 4 | 3 |
| *Hydrocotyle ranunculoides* | 0 | 1 |
| *Elodea canadensis* | 9 | 1 |
| *Elodea nuttalli* | 1 | 0 |
| *Lagarosiphon major* | 7 | 1 |
| *Azolla filiculoides* | 2 | 0 |
| *Lemna minuta* | 2 | 1 |