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A survey of aquatic macroinvertebrates in the Butts Pond, Staines Moor, following flooding of the site in October 1993



A report for the National Rivers Authority (Thames Region)

Pond Action

December 1993

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Summary

This report supplements an earlier study by Pond Action on the Butts Pond, Staines Moor, undertaken as part of the Lower Colne Improvement/Staines Bypass Channel project. This study ('A survey of the wetland plants and macroinvertebrates of the Butts Pond, Staines Moor' (Pond Action, 1993)) assessed the conservation value of the Butts Pond and commented on the likely impact of routing flood water through the pond. It indicated that the Butts Pond had considerable conservation interest and that, whilst flooding was a natural event for the pond, inputs of polluted floodwater might be damaging

Shortly after this work was completed a flood event in October 1993 occurred in which the Wraysbury River overtopped its banks. Water levels were high enough to indicate that flood water entered the Butts Pond. The opportunity was taken, therefore, to re-survey the macroinvertebrate community to determine whether flooding had had any major effects on the pond.

Comparison of macroinvertebrate species lists before and after flooding indicated that there was little obvious effect on the pond community. The number of species recorded after the flood (81) was very similar to the number recorded in the last survey in September 1993 (82 species). Eight common species were recorded for the first time in the post-flood survey but none indicated any particular change in habitat and/or conditions.

Overall, there was no clear evidence of adverse impacts on the Butts Pond as a result of the October flooding. However, adverse impacts cannot be ruled out because:

- (i) the effects of pollutants carried in the floodwater may not be immediately obvious (e.g. sub-lethal levels of pollutants may affect a range of biological processes such as predation, competition and reproductive success).
- (ii) ponds are a sink for pollutants and therefore pollutant levels in the pond may progressively increase with successive flood inputs.

As noted in the previous report, the impact of floodwater on the Butts Pond will ultimately depend on the extent to which existing water quality in the pond is modified by inputs of floodwater.

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1. Introduction

This report supplements an earlier study by Pond Action on the Butts Pond: 'A survey of the wetland plants and macroinvertebrates of the Butts Pond, Staines Moor' (Pond Action, 1993).

1.1 Background to the study

As part of the Lower Colne Improvement/Staines Bypass Channel project, Pond Action carried out a programme of survey work on the Butts Pond (Staines Moor) between May and September 1993. The aim of the work undertaken was to:

- (i) assess the nature conservation value of the pond based on its wetland plant and aquatic macroinvertebrate communities.
- (ii) make recommendations about the likely impact of routing flood water through the pond.

The study found that (a) the pond supported plant and animal communities of considerable conservation interest and (b) whilst flooding was a natural event for floodplain ponds, inputs of polluted floodwater might be damaging. However, the report also noted that since there have been no detailed studies of the effects of flooding on pond communities, accurate prediction of the impacts from the Colne Improvement project were difficult to make.

Shortly after the report was completed a flood event in October 1993 occurred in which the Wraysbury River overtopped its banks. Water levels were high enough to indicate that flood water entered the Butts Pond (although flooding of the pond was not actually observed) (John Pulsford, NRA Thames Region, pers. comm.). Since this appeared to be an extremely unusual event (flooding was last believed to have occurred some 15 years ago), the opportunity was taken to re-survey the pond after the flood to determine whether any major changes had occurred.

1.2 Objectives of the November 1993 survey

The aim of the post-flood survey was to investigate changes in the macroinvertebrate community of the pond following flooding. The survey was exploratory and intended to give an indication of the scale of impact of flooding, rather than being a detailed study of the effects of flooding. No further botanical work was undertaken as the first frosts were beginning to kill off wetland plants in the pond by the time that the survey was commissioned.

2. Methods

Survey work was undertaken on 4 November 1993. Macroinvertebrate survey methods were directly comparable with those used in the previous study (Pond Action, 1993).

The following macroinvertebrate groups, where present, were identified to species level: freshwater mussels (Unionacea and *Sphaerium* spp.), freshwater snails and limpets (Gastropoda), leeches (Hirudinea), the Water Spider (*Argyroneta aquatica*), slaters and freshwater shrimps (Malacostraca), mayflies (Ephemeroptera), dragonflies and damselflies (Odonata), water bugs (Heteroptera), alderflies (Megaloptera), caddis flies (Trichoptera), moths with aquatic larvae (Lepidoptera) and water beetles (Coleoptera). True-flies with aquatic larvae (Diptera) were identified to family level.

Results were compared with the three previous surveys of the pond undertaken in 1993 (on 11th May, 9th August and 24th September).

3. Results

3.1 Changes in the macroinvertebrate fauna before and after the flood

The number of species recorded after the flood (81) was very similar to the number recorded in the last survey in September 1993 (82 species). No new rare, local or notable species were recorded on the 4th November. Appendix 1 gives a list of species and families recorded on November 4th.

3.2 Macroinvertebrate species not previously recorded

Of the 81 species recorded, eight had not previously been found in the Butts Pond. All are common and widespread species and included: *Glossiphonia complanata* (a leech); *Gerris thoracicus* (a pond skater); *Sigara fossarum* (a lesser waterboatman); and the water beetles *Coelambus confluens*, *Colymbetes fuscus*, *Ilybius fuliginosus* (diving beetles), *Helophorus grandis* and *Laccobius striatulus* (water scavenger beetles).

None of the eight species specialise, on the whole, in any particular habitat and/or conditions. *Laccobius striatulus* is, perhaps, more usually (though by no means exclusively) associated with trickles, streams and rivers (Friday, 1988) but is often found in gravel pit lakes (Pond Action, unpublished observations), favouring locations where there are muddy banks; *Gerris thoracicus* is frequently seen in large water-bodies, usually with little plant cover (Savage, 1989); and *Sigara fossarum* is more typical of rivers and lakes than of ponds (Savage, 1989). Since all eight species occur in a wide range of habitats it cannot be stated with any certainty whether these species were introduced by the flooding, or were already present in the pond before the flooding occurred. Similarly they do not suggest any particular change in the conditions in the Butts Pond as a direct result of the flood.

Some species not recorded in November were abundant during the earlier surveys, and the reason for their absence in the November post-flood survey is not easy to account for. These included the leech *Erpobdella octoculata*, the beetle *Haliphus lineatocollis* and the Common Blue Damselfly *Enallagma cyathigerum*.

3.3 Adult dragonflies and damselflies

Sympetrum striolatum (the Common Darter) was observed near the pond edge. This species was also recorded on August 9th and 15th. Its occurrence is not unexpected since it is "frequently the last dragonfly to be seen in the year" (Hammond, 1983).

4. Assessment of effect of flooding on the Butts Pond

Comparison of species lists before and after flooding indicates that there was little obvious effect on the macroinvertebrate community of the pond. The number of species recorded before and after flooding was almost the same and the 8 species not previously recorded do not indicate any particular trend in the environment of the pond or its invertebrate community.

Likewise, there were few significant omissions from the species list. The main exceptions to this were *Erpobdella octoculata*, *Haliphus lineatocollis* and *Enallagma cyathigerum* all of which were present in abundance in other samples. Their absence in the post flooding sample cannot be easily explained and there remains a possibility that they were early victims of pollution carried by the flood water. However, other explanations are equally possible including predation, winter diapause or habitat change (e.g. burial in the banks or sediment). Since all three species are common and widespread it seems unlikely that they would be particularly sensitive to pollution.

5. Conclusions

There is no clear evidence of adverse impacts on the Butts Pond as a result of the October flooding. In particular:

- (i) There is no evidence of the introduction of new species which could adversely affect the existing pond community.
- (ii) There is no unequivocal evidence that the flood water resulted in significant pollution immediately damaging the pond's invertebrate community.

However, neither of these observations should be taken as conclusive evidence that the river water was not polluting. This is because:

- (i) Many of the effects of water pollution may not be immediately obvious from species lists. For example, there may be a whole range of secondary effects at sub-lethal levels including changes to biological processes such as predation, competition and reproductive success.
- (ii) Ponds are a sink for pollutants and therefore pollutant levels in the pond may progressively increase with subsequent flood inputs.

As noted in the previous report (Pond Action, 1993), the impact of floodwater on the Butts Pond will ultimately depend on the extent to which existing water quality in the pond is modified by inputs of floodwater.

6. References

Friday, L.E. (1988). A key to the adults of British water beetles (AIDGAP Key). *Field Studies Council Publication 189*.

Hammond, C.O. (1983). *The Dragonflies of Great Britain and Ireland*. Harley Books.

Pond Action (1993). *A survey of the wetland plants and macroinvertebrates of the Butts Pond, Staines Moor*. A report for the National Rivers Authority.

Savage, A.A. (1989). Adults of the British aquatic Hemiptera Heteroptera. *Freshwater Biological Association Scientific Publication 50*.

APPENDIX 1. Macroinvertebrates recorded in the Butts Pond, Staines Moor, on 4th November 1993, following flooding of site

Note: * = Nationally Notable B; § = Local. (English names are given where they exist.)
† = Species not recorded during previous visits.

Unionacea and *Sphaerium* spp. (Freshwater Mussels)

<i>Sphaerium corneum</i>	An orb mussel
<i>Sphaerium lacustre</i>	An orb mussel

Gastropoda (Snails and Limpets)

<i>Acroloxus lacustris</i>	Lake Limpet
<i>Anisus leucostoma</i>	Button Ramshorn
<i>Anisus vortex</i>	Whirlpool Ramshorn
<i>Armiger crista</i>	Nautilus Ramshorn
<i>Bathymphalus contortus</i>	A ramshorn snail
<i>Bithynia leachi</i>	Leach's Bithynia
<i>Bithynia tentaculata</i>	The Bithynia
<i>Gyraulus albus</i>	White Ramshorn
<i>Hippeutis complanatus</i>	Flat Ramshorn
<i>Lymnaea palustris</i>	Marsh Snail
<i>Lymnaea peregra</i>	Wandering Snail
<i>Lymnaea stagnalis</i>	Great Pond Snail
<i>Lymnaea truncatula</i>	Dwarf Pond Snail
<i>Planorbarius corneus</i>	Great Ramshorn
<i>Planorbis carinatus</i>	Keeled Ramshorn
<i>Planorbis planorbis</i>	The Ramshorn
<i>Potamopyrgus jenkinsi</i>	Jenkins' Spire Shell
<i>Valvata cristata</i>	Flat Valve Snail

Hirudinea (Leeches)

<i>Erpobdella testacea</i> §
<i>Glossiphonia complanata</i> †
<i>Glossiphonia heteroclita</i> §
<i>Helobdella stagnalis</i>
<i>Theromyzon tessulatum</i>

Araneae (Spiders)

<i>Argyroneta aquatica</i>	Water Spider
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Malacostraca (Slaters and freshwater shrimps)

<i>Asellus aquaticus</i>	A water slater, or hog-louse
<i>Crangonyx pseudogracilis</i>	A freshwater shrimp

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APPENDIX 1.
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**Macroinvertebrates recorded in the Butts Pond, Staines Moor, on
4th November 1993, following flooding of site**

Ephemeroptera (Mayflies)

<i>Caenis robusta</i> §	A 'white midge', or 'anglers' curse'
<i>Cloeon dipterum</i>	Pond Olive

Odonata (Damselflies and dragonflies: larvae in pond)

<i>Coenagrion puella/pulchellum</i>	Azure Damselfly/Variable Damselfly
<i>Ischnura elegans</i>	Blue-tailed Damselfly
<i>Libellula depressa</i>	Broad-bodied Chaser
<i>Libellula quadrimaculata</i>	Four-spotted Chaser

Odonata (Damselflies and dragonflies: adults on the wing)

<i>Sympetrum striolatum</i>	Common Darter
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Heteroptera (Water bugs)

<i>Callicorixa praeusta</i>	A lesser waterboatman
<i>Corixa punctata</i>	A lesser waterboatman
<i>Gerris lacustris</i>	A pond skater
<i>Gerris thoracicus</i> †	A pond skater
<i>Hesperocorixa linnei</i>	A lesser waterboatman
<i>Hesperocorixa sahlbergi</i>	A lesser waterboatman
<i>Ilyocoris cimicoides</i>	Saucer Bug
<i>Nepa cinerea</i>	Water Scorpion
<i>Notonecta glauca</i>	A greater waterboatman
<i>Notonecta marmorea viridis</i>	A greater waterboatman
<i>Sigara distincta</i>	A lesser waterboatman
<i>Sigara dorsalis</i>	A lesser waterboatman
<i>Sigara falleni</i>	A lesser waterboatman
<i>Sigara fossarum</i> †	A lesser waterboatman
<i>Sigara lateralis</i>	A lesser waterboatman
<i>Sigara limitata</i>	A lesser waterboatman
<i>Sigara nigrolineata</i>	A lesser waterboatman

Megaloptera (Alderflies)

<i>Sialis lutaria</i>

Trichoptera (Caddis flies)

<i>Agraylea multipunctata</i>
<i>Agraylea sexmaculata</i>

Lepidoptera (Moths and butterflies)

<i>Cataclysta lemnata</i>	A moth
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**APPENDIX 1.
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**Macroinvertebrates recorded in the Butts Pond, Staines Moor, on
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Coleoptera (Beetles)

Agabus sturmii
Coelambus confluens†
Coelambus impressopunctatus
Colymbetes fuscus†
Haliphus flavicollis
Haliphus immaculatus
Haliphus ruficollis
*Helochares lividus**
Helophorus brevipalpis
Helophorus grandis†
Hydrobius fuscipes
*Hydroglyphus pusillus**
Hydroporus palustris
Hydroporus planus
Hygrobia hermanni Screech Beetle
Hygrotus inaequalis
Hyphydrus ovatus
Ilybius fuliginosus†
Laccobius bipunctatus
Laccobius minutus
Laccobius striatulus†
Laccophilus minutus
Noterus clavicornis
*Noterus crassicornis**
*Peltodytes caesus**
*Rhantus suturalis**

Total number of species (excluding adult Odonata): 81

Diptera (True-flies)

Larvae of the following families were recorded, but were not identified to species level:

Ceratopogonidae	Biting midges
Chaoboridae	Phantom midges
Chironomidae	Plumed gnats, non biting midges
Culicidae	Mosquitoes
Dixidae	Meniscus midges