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**A SUMMER SURVEY OF THE AQUATIC MACROINVERTEBRATES OF TWO PONDS AND A LAKE  
CLOSE TO THE PROPOSED ROUTE OF THE A11  
NEAR LARLING AND SNETTERTON, NORFOLK**

**A REPORT TO ALCONBURY ENVIRONMENTAL CONSULTANTS**

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**A SUMMER SURVEY OF THE AQUATIC MACROINVERTEBRATES OF TWO PONDS AND  
A LAKE CLOSE TO THE PROPOSED ROUTE OF THE A11 NEAR LARLING AND  
SNETTERTON, NORFOLK**

**SUMMARY**

The aquatic macroinvertebrates of two ponds (Arable Field Pond and Roadside Pond) and a small lake (Soth Farm Lake) close to the proposed route of the A11 near Larling and Snetterton, Norfolk, were sampled on the 21 and 22 July 1990.

The Arable Field Pond, approximately 25m in diameter, was located in a hollow and surrounded by scrub and trees. The Roadside Pond, which was about 50m in diameter, was also located in a slight depression and surrounded by scrub and trees. Both ponds could be pingos and therefore of natural origin. The South Farm Lake, about 4.5ha in area, is recently created and is used as an irrigation reservoir.

30 species of macroinvertebrate were recorded in the Arable Field Pond including 3 local species (the water beetles Cercyon sternalis, Laccobius sinuatus and Graptodytes granularis). 44 species of macroinvertebrate were recorded in the Roadside Pond including 2 local species (the corixid bug Corixa panzeri and the water beetle Helochaeres lividus). 51 species were recorded in South Farm Lake including 7 local species (the mayfly Cloeon simile, the damselfly Erythromma najas, the dragonfly Orthetrum cancellatum, the water stick insect [Ranatra linearis], the haliplid beetle Halipus obliquus, the hydrophilid beetles Helochaeres lividus and Laccobius sinuatus and the dytiscid beetles Ilybius fenestratus and Rhantus exsoletus).

The conservation value of the macroinvertebrate communities of the two ponds is intermediate to high. The conservation value of the community in South Farm Lake is high.

It is recommended that all three sites are protected from impacts of road construction. If possible, conservation management work should be undertaken on the two ponds.

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CONTENTS

	<b>SUMMARY</b>	(i)
1.	<b>INTRODUCTION</b>	2
2.	<b>METHODS</b>	2
3.	<b>RESULTS</b>	3
3.1	Descriptions of the ponds and lake.	3
3.2	Assessment of the nature conservation value of the ponds and lake.	5
4.	<b>RECOMMENDATIONS</b>	5
5.	<b>REFERENCES</b>	6
	<b>TABLES</b>	
1.	Provisional system for assessing the nature conservation value of aquatic macroinvertebrate communities.	7
2.	Local and uncommon species recorded from two ponds and a lake close to the proposed route of the A11 near Larling and Snetterton, Norfolk.	8
	<b>APPENDIX</b>	
1.	Aquatic macroinvertebrates recorded in two ponds and a small lake close to the proposed route of the A11 near Larling and Snetterton, Norfolk.	10

## 1. INTRODUCTION

This report describes the results of surveys of two ponds and a small lake close to the proposed route of the All near Larling and Snetterton, Norfolk. The surveys were undertaken to provide a preliminary assessment of the nature conservation value of the three sites.

The sites surveyed were:

Arable Field Pond (TM011912)

(Note that this site consisted of three depressions of which only one contained water at the time of the survey.)

Roadside Pond (TL993893)

South Farm Lake (TL985893)

Other ponds close to the proposed route of the road were dry in July and were not surveyed.

Surveys were carried out on 21 and 22 July 1990.

## 2. METHODS

Aquatic macroinvertebrates were surveyed following the standard survey methodology developed by Pond Action for the National Pond Survey. Semi-quantitative samples of macroinvertebrates were collected by hand-netting of individual micro-habitats in each water-body. Each water-body was sampled for three minutes with the total sampling time equally divided between micro-habitats. Micro-habitat samples were pooled to give a composite sample from each water-body. Microhabitats included stands of water plants, areas of distinctive substrates and submerged logs, branches and twigs. Microhabitats were sampled from the shoreline or from a boat. Unpublished studies undertaken by Pond Action suggest that this method of sampling is reliable in water bodies of a wide range of sizes (eg Pond Action, 1990). An additional search for species which might not have been recorded in the timed samples was also made at each site. This search lasted for approximately 60 minutes.

Samples were sorted in the laboratory. Macroinvertebrates in the following groups were removed from the samples and identified to species level: leeches, gastropod snails, shrimps and slaters, mayflies, dragonflies, bugs, alderflies, caddis-flies, beetles. Other groups were not recorded. Full details of this survey methodology are given Pond Action (1989).

### 3. RESULTS

#### 3.1 Description of the ponds and lake

##### 3.1.1 Arable Field Pond

###### **General description**

The Arable Field Pond is a roughly circular field pond, approximately 25m in diameter, situated in a deep hollow with steep banks 6-7m high. It is possible that the pond is a pingo and therefore of natural origin. East Harling Common PSSSI (about 2km south of this site) has a number of pingos.

Land around the pond was under arable cultivation. The pond basin lies on a hedgeline and is surrounded by shrubs and trees which moderately shade the pond. At the time of the survey the total depth of water in the pond was about 1.5-2m of which 0.5-1.0m was sediment (largely leaf litter). It is likely that the pond does not dry out completely but the structure of the surrounding vegetation suggests that water levels fluctuate considerably.

At the time of the survey the main microhabitats available for macroinvertebrates were: leafy sediment in shallow water (less than 1m); leafy sediment in deeper water (more than 1m); submerged branches and twigs.

###### **Macroinvertebrates**

30 species of macroinvertebrate were recorded, of which 24 were beetles and bugs. The fauna was dominated numerically by Corixidae (lesser water-boatmen) and leeches. The large corixid, Corixa punctata was unusually abundant. The leeches were mainly juveniles (predominantly Helobdella stagnalis), reflecting the fact that H.stagnalis reaches its maximum population density in mid-summer (Elliott and Mann, 1979).

Three of the species recorded were local. These were the hydrophilid beetles Cercyon sternalis and Laccobius sinuatus and the dytiscid beetle Graptodytes granularis (see Table 2).

##### 3.1.2 Roadside Pond

###### **General description**

The Roadside Pond was about 50m in diameter with trees and scrub overhanging most of the margins. The pond lies immediately beside the existing All. Agricultural land around the pond was under arable cultivation. Information from the owner of South Farm suggested that surface runoff from Snetterton Circuit was piped to this pond although there was no evidence of pipes at the edge of the pond.

The pond is situated in a hollow about 3m deep with an area of willow scrub at one end. It is possible that this pond is also a pingo and therefore of natural origin.

At the time of survey the microhabitats available for macroinvertebrates were: leaf litter and Ceratophyllum in shallow water (less than 1m); leaf litter in deep water (more than 1m); a stand of Ceratophyllum (which filled most of the pond); submerged twigs and branches.

### **Macroinvertebrates**

44 species of macroinvertebrate were recorded in the Roadside Pond, 27 of which were bugs or beetles. The nautilus ramshorn (Armiger crista) and the small hydraenid beetle Ochthebius minimus were notably common and were found among the C.submersum. The brackish water species Notonecta viridis was recorded, perhaps suggesting that salt enters the pond in runoff from the All.

Two of the species recorded in the pond were local. These were the Corixid bug Corixa panzeri and the Hydrophilid beetle Helochaeres lividus. C.panzeri was present in high enough numbers to suggest that it might be breeding at the site (see Appendix 2).

### **3.1.3 South Farm Lake**

#### **General description**

South Farm Lake is about 4.5ha in area recently excavated in gravels underlying peat. The lake is not marked on the 1:50,000 scale OS map of the area (Sheet 144 Landranger Series) which was revised in 1980 with selected revision in 1984 and 1986. The lake is steep sided with largely uncolonised gravel banks with occasional exposed peat. The pit is surrounded in part by mown grass and in part by sedge/rush fen.

At the time of the survey the microhabitats available for macroinvertebrates were: bare gravelly margins in water less than 1m deep; bare peaty margins in water less than 1m deep; stands of Potamogeton natans; stands of Potamogeton trichoides and Chara sp. in shallow water (less than 1m deep) and stands of P.trichoides and Chara sp. in deeper water (more than 1m deep).

#### **Macroinvertebrates**

51 species of macroinvertebrate were recorded at this site, 26 of which were beetles or bugs. The wandering snail (Lymnaea peregra), Jenkin's spire shell (Potamopyrgus jenkinsi) and the mayfly Caenis luctuosa were notably abundant. The presence of only three species of gastropod snail in a large, permanent, hard water site suggests that the macroinvertebrate community is immature (in the Thames Valley well established riverside ponds may support 10-20 species of gastropod molluscs).

Nine of the species recorded were local or uncommon species. These were the mayfly Cloeon simile, the damselfly Erythromma najas, the dragonfly Orthetrum cancellatum, the water stick insect (Ranatra linearis), the haliplid beetle Haliplus obliquus, the hydrophilid beetles Helochaeres lividus and Laccobius sinuatus and the dytiscid beetles Ilybius fenestratus and Rhantus exsoletus (see Table 2).

## **3.2 ASSESSMENT OF THE CONSERVATION VALUE OF THE PONDS AND LAKE**

### **3.2.1 Arable Field Pond**

30 species of macroinvertebrate, including 3 local species, were recorded in the Arable Field Pond. The aquatic macroinvertebrate community should be considered to be of intermediate/high nature conservation value (see Tables 1 and 2).

### **3.2.2 Roadside Pond**

44 species of macroinvertebrate, including 2 local species, were recorded in the Roadside Pond. The aquatic macroinvertebrate community should be considered to be of intermediate/high nature conservation value (see Tables 1 and 2).

### **3.2.3 South Farm Lake**

The occurrence of large numbers of local species is not unusual in new or immature sites. Nevertheless, with 51 species, 9 of which are local, the aquatic macroinvertebrate community of the lake should be considered to be of high value to nature conservation (see Tables 1 and 2).

## **4. RECOMMENDATIONS**

All three sites surveyed should, if possible, be protected from damaging impacts due to road construction.

The Roadside Pond and the Arable Field Pond would benefit from some management work, especially partial removal of shading trees and shrubs (both ponds) and dumped rubbish (Roadside Pond).

5.

REFERENCES

Elliott, J.M. and Mann, K.H. (1979). A key to the British freshwater leeches with notes on their life cycles and ecology. Scientific Publications of the Freshwater Biological Association, No. 40, 1-72.

Pond Action (1989). National Pond Survey Methods Booklet (Draft Edition). pp 23. Pond Action, Oxford.

Pond Action (1990). The Datchet, Wraysbury, Staines and Chertsey Flood Study: Aquatic Biology. Part 1: A survey of the wetland plant and aquatic macroinvertebrate communities of selected gravel pit lakes in the Datchet-Chertsey Complex. Unpublished report to the National River Authority (Thames Region).



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**TABLE 1. PROVISIONAL SYSTEM FOR ASSESSING THE NATURE CONSERVATION VALUE OF  
AQUATIC MACROINVERTEBRATE COMMUNITIES**

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<b>CONSERVATION VALUE</b>	<b>DESCRIPTION OF TYPE OF COMMUNITY</b>
VERY HIGH	Supporting a rich community of macroinvertebrate species, including local and rare species. Note that some sites with rare species may be relatively species-poor.
HIGH	Supporting a rich community of common macroinvertebrate species. Generally more than three local or uncommon species recorded. No rare species.
INTERMEDIATE	Supporting a moderately rich macroinvertebrate community. Generally up to three local or uncommon species. No rare species.
LOW	Supporting a species-poor macroinvertebrate community. No rare, local or uncommon species.

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**TABLE 2. LOCAL AND UNCOMMON SPECIES RECORDED FROM TWO PONDS AND A LAKE  
CLOSE TO THE PROPOSED ROUTE OF THE A11 NEAR LARLING AND  
SNETTERTON, NORFOLK**

For many aquatic macroinvertebrates up-to-date distribution information is available only from the NCC ISR team at Peterborough (J. Bratton), from individual recorders of individual groups (eg D. Bilton for Coleoptera) or from Pond Action's own survey work. Where information on invertebrate distributions is not commonly available, we have cited these sources.

Cloeon simile: (Baetidae: EPHEMEROPTERA)

The lake olive. Widespread but locally distributed. Favouring larger water bodies, though often found in new gravel workings.

Sources: J. Bratton, pers. comm; Pond Action (unpublished results)

Erythromma najas: (Coenagrionidae: ODONATA)

The red-eyed damselfly. Locally common, predominantly in Southern England. Associated with large ponds and lakes.

Orthetrum cancellatum: (Libellulidae: ODONATA)

Locally common in Southern England.

Corixa panzeri: (Corixidae: HETEROPTERA)

A lesser water boatman. A species local to South East England but rare elsewhere.

Source: J. Bratton, pers. comm.

Ranatra linearis: (Nepidae: HETEROPTERA)

The water stick insect. A local species which prefers slow flowing rivers and large water bodies.

Source: J. Bratton, pers. comm.

Haliplus obliquus: (Haliplidae: COLEOPTERA)

A crawling water beetle. A species with a widespread but local distribution. The species is usually associated with Charophytes. The species is Nationally Notable B.

Source: D. Bilton, pers. comm.

Cercyon sternalis: (Hydrophilidae: COLEOPTERA)

A water scavenger beetle. Local and uncommon in Southern England.

Helochares lividus: (Hydrophilidae: COLEOPTERA)

A water scavenger beetle. Locally common in South East England. The species is Nationally Notable B.

Source: D. Bilton, pers. comm.

Laccobius sinuatus: (Hydrophilidae: COLEOPTERA)

A water scavenger beetle. Widespread but uncommon. The species is often associated with new sites.

Graptodytes granularis: (Dytiscidae: COLEOPTERA)

A diving beetle. Locally common in South East England.

Ilybius fenestratus: (Dytiscidae: COLEOPTERA)

A diving beetle. The species has relict populations in lakes in south-west Scotland but is otherwise associated with man-made lakes and canals in east England. Its distribution is unusual but appears to indicate avoidance of brackish water.

Source: Foster et al. (1990)

Rhantus exsoletus: (Dytiscidae: COLEOPTERA)

A diving beetle. Common in sedge beds in Southern Scotland but local elsewhere.

**APPENDIX 1. MACROINVERTEBRATES RECORDED FROM TWO PONDS AND A LAKE CLOSE TO THE PROPOSED ROUTE OF THE A11 NEAR LARLING AND SNETTERTON, NORFOLK**

+ indicates that the species was recorded in the 'additional search' on site but not recorded in the time-limited sample.

	ROADSIDE POND	SOUTH FARM LAKE	ARABLE FIELD POND
<b>HIRUDINEA (leeches)</b>			
<i>Erpobdella octoculata</i>	40	24	-
<i>Glossiphonia complanata</i>	40	16	8
<i>Helobdella stagnalis</i>	24	48	148
<i>Theromyzon tessulatum</i>	48	64	40
<b>GASTROPODA (snails)</b>			
<i>Acroloxus lacustris</i>	1	-	-
<i>Armiger crista</i>	632	-	-
<i>Hippeutis complanatus</i>	128	-	4
<i>Lymnaea peregra</i>	+	768	-
<i>Lymnaea stagnalis</i>	-	+	-
<i>Planorbis planorbis</i>	+	-	-
<i>Potamopyrgus jenkinsi</i>	-	1,240	-
<b>MALAACOSTRACA (shrimps &amp; slaters)</b>			
<i>Asellus aquaticus</i>	-	1	-
<i>Asellus meridianus</i>	21	-	-
<i>Gammarus pulex</i>	-	27	-
<b>EPHEMEROPTERA (mayflies)</b>			
<i>Caenis horaria</i>	-	48	-
<i>Caenis luctuosa</i>	-	184	-
<i>Cloeon dipterum</i>	100	104	60
<i>Cloeon simile</i>	-	1	-
<i>Ephemera vulgata</i>	-	1	-
<b>ODONATA (dragonflies)</b>			
<i>Aeshna cyanea</i>	+	-	-
<i>Coenagrion puella/pulchellum</i>	2	-	-
<i>Enallagma cyathigerum</i>	-	2	-
<i>Erythromma najas</i>	-	24	-
<i>Ischnura (elegans)</i>	-	120	-
<i>Orthetrum cancellatum</i>	-	1	-

	ROADSIDE POND	SOUTH FARM LAKE	ARABLE FIELD POND
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+ indicates that the species was recorded in the 'additional search' on site but not recorded in the time-limited sample.

**HETEROPTERA (bugs)**

<i>Callicorixa praeusta</i>	1	1	18
<i>Corixa panzeri</i>	7	-	-
<i>Corixa punctata</i>	6	+	202
<i>Gerris lacustris</i>	+	-	-
<i>Hesperocorixa linnei</i>	-	-	3
<i>Hesperocorixa sahlbergi</i>	2	+	59
<i>Ilyocoris cimicodes</i>	-	1	-
<i>Nepa cinerea</i>	-	+	-
<i>Notonecta glauca</i>	2	-	2
<i>Notonecta viridis</i>	1	-	-
<i>Plea leachi</i>	4	1	-
<i>Ranatra linearis</i>	-	1	-
<i>Sigara distincta</i>	-	-	20
<i>Sigara dorsalis</i>	8	24	12
<i>Sigara fossarum</i>	-	-	1
<i>Sigara lateralis</i>	-	1	13
<i>Sigara nigrolineata</i>	-	-	3

**MEGALOPTERA (alderflies)**

<i>Sialis lutaria</i>	7	8	24
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**TRICHOPTERA (caddis-flies)**

<i>Holocentropus picicornis</i>	6	-	-
<i>Limnephilus lunatus</i>	3	4	-
<i>Limnephilus rhombicus</i>	-	1	-
<i>Mystacides longicornis</i>	-	48	-
<i>Oecetis ochracea</i>	-	2	-
<i>Phryganea striata</i>	-	1	-

**COLEOPTERA (beetles).**

<i>Agabus bipustulatus</i>	2	-	+
<i>Agabus sturmi</i>	-	+	-
<i>Anacaena bipustulata</i>	3	+	5
<i>Anacaena globulus</i>	1	-	-
<i>Cercyon sternalis</i>	-	-	1
<i>Coelambus impressopunctatus</i>	1	-	-
<i>Colymbetes fuscus</i>	-	+	-
<i>Copelatus haemorrhoidalis</i>	1	-	-

ROADSIDE  
POND

SOUTH FARM  
LAKE

ARABLE FIELD  
POND

+ indicates that the species was recorded in the 'additional search' on site but not recorded in the time-limited sample.

**COLEOPTERA** (continued)

<i>Cymbiodyta marginella</i>	1	+	-
<i>Graptodytes granularis</i>	-	-	1
<i>Halplus fluviatilis</i>	2	-	1
<i>Halplus lineatocollis</i>	+	1	1
<i>Halplus lineolatus</i>	2	-	-
<i>Halplus obliquus</i>	-	2	-
<i>Halplus ruficollis</i>	-	1	2
<i>Halplus wehnckeii</i>	-	1	-
<i>Helochares lividus</i>	1	+	-
<i>Hydrobius fuscipes</i>	6	-	-
<i>Hydroporus angustatus</i>	1	-	1
<i>Hydroporus palustris</i>	+	-	7
<i>Hygrotus decoratus</i>	1	-	-
<i>Hygrotus inaequalis</i>	10	8	4
<i>Hyphydrus ovatus</i>	2	-	-
<i>Ilybius fenestratus</i>	-	+	-
<i>Ilybius fuliginosus</i>	+	+	-
<i>Laccobius minutus</i>	-	128	-
<i>Laccobius sinuatus</i>	-	4	+
<i>Laccophilus hyalinus</i>	-	1	-
<i>Laccophilus minutus</i>	2	-	5
<i>Ochthebius minimus</i>	50	24	8
<i>Rhantus exsoletus</i>	-	1	-
<i>Suphrodytes dorsalis</i>	-	-	5