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**THE DATCHET, WRAYSBURY, STAINES AND CHERTSEY FLOOD STUDY:**

**AQUATIC BIOLOGY**

**A SURVEY OF THE WETLAND PLANT AND MACROINVERTEBRATE COMMUNITIES  
OF SELECTED GRAVEL PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX**

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## **CONTENTS**

## **PAGE**

<b>SUMMARY</b>	<b>(I)</b>
<b>CONTENTS</b>	<b>(III)</b>
<b>1. BACKGROUND</b>	<b>1</b>
<b>2. AIMS OF THE STUDY</b>	<b>1</b>
<b>2. METHODS</b>	<b>2</b>
2.1 GRAVEL PIT LAKES SURVEYED	2
2.2 WETLAND PLANTS	4
2.3 MACROINVERTEBRATE SAMPLING AND IDENTIFICATION	4
2.3.1 Macroinvertebrate sampling	
2.3.2 Sorting and identification of samples	
2.4 STATISTICAL ANALYSIS USING DECORANA	5
2.5 ASSESSMENT OF THE CONSERVATION VALUE OF THE LAKES	5
2.5.1 Criteria used to assess the conservation value of the lakes	
2.5.2 Definition of the terms 'rare' and 'local' as used in this report	
<b>3. RESULTS</b>	<b>7</b>
3.1 THE WETLAND PLANT COMMUNITY	7
3.1.1 Numbers of species recorded	
3.1.2 Classification of the plant communities of the lakes surveyed in 1991	
3.1.3 Plant species-richness	
3.1.4 Rare and local wetland plants	
3.2 THE MACROINVERTEBRATE COMMUNITY	
3.2.1 Species richness and composition of the fauna	
3.2.2 Rare and local species	
3.2.3 The similarity of the macroinvertebrate communities in the lakes	
<b>4. ASSESSMENT OF THE NATURE CONSERVATION VALUE OF WETLAND PLANT AND AQUATIC MACROINVERTEBRATE COMMUNITIES IN 18 GRAVEL-PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX</b>	<b>17</b>
4.1 INTRODUCTION	17
4.2 LAKES OF VERY HIGH CONSERVATION VALUE	17
4.3 LAKES OF HIGH CONSERVATION VALUE	18
4.4 LAKES OF INTERMEDIATE CONSERVATION VALUE	18

<b>5.</b>	<b>THE SENSITIVITY OF THE LAKES TO FLOOD WATER INPUTS</b>	<b>2 1</b>
5.1	INTRODUCTION	21
5.2	WATER QUALITY AND PHYSICAL DAMAGE	21
5.2.1	Water quality	
5.2.2	Protecting populations of rare or uncommon species from physical damage	
<b>6.</b>	<b>BRIEF DESCRIPTIONS OF THE MACROINVERTEBRATE COMMUNITIES OF INDIVIDUAL LAKES</b>	<b>2 6</b>
6.1	LEISURE SPORT 3 (SITE A)	26
6.2	LEISURE SPORT 2 (SITE B)	27
6.3	LONGFIELD FARM (SITE C)	28
6.4	HYTHE END (SITE E)	29
6.5	EGHAM HYTHE (SITE F)	30
6.6	GREENHAM 1 (SITE G1)	31
6.7	GREENHAM 2 (SITE G2)	32
6.8	SHEPPERTON LARGE (SITE H)	33
6.9	SHEPPERTON SMALL (SITE I)	34
6.10	FERRY LANE (SITE J)	35
6.11	WRAYSBURY 2 (SITE W)	36
<b>7.</b>	<b>REFERENCES</b>	<b>3 7</b>
<b>APPENDIX 1.</b>	<b>Wetland plants recorded in ten lakes in the Datchet-Chertsey complex in autumn 1991.</b>	<b>3 8</b>
<b>APPENDIX 2.</b>	<b>Status in Britain of rare and local plants recorded in the gravel pit lakes of the Datchet-Chertsey complex.</b>	<b>4 0</b>
<b>APPENDIX 3</b>	<b>Common names of wetland species recorded at the gravel pit lakes.</b>	<b>4 2</b>
<b>APPENDIX 4.</b>	<b>Aquatic macroinvertebrates recorded in eleven lakes in the Datchet-Chertsey complex in autumn 1991.</b>	<b>4 4</b>
<b>APPENDIX 5</b>	<b>Status in Britain of rare and local aquatic macroinvertebrates recorded in the gravel-pit lakes of the Datchet-Chertsey complex.</b>	<b>4 8</b>

## **TABLES, FIGURES AND MAPS**

### **TABLES**

1.	Gravel-pit lakes surveyed in 1991 in the Datchet-Chertsey complex.	2
2.	Macroinvertebrate groups collected in the gravel-pit lakes and identified to species level.	6
3.	Aquatic plant species recorded in 10 gravel-pit lakes in the Datchet-Chertsey complex.	9
4.	Rare and local wetland plant species recorded in 10 gravel-pit lakes in the Datchet-Chertsey complex.	10
5.	The number of species recorded in major taxa in eleven gravel-pit lakes in the Datchet-Chertsey complex.	12
6.	Rare and local macroinvertebrate species recorded in eleven gravel-pit lakes in the Datchet-Chertsey complex.	13
7.	Criteria used to assess conservation value of the gravel-pit lakes.	19
8.	Sensitivity of the gravel-pit lakes to inputs of river flood water.	23

### **MAPS**

1.	Location of the gravel-pit lakes surveyed for the 1989 and 1991 aquatic biology surveys.	3
2.	Sensitivity of gravel-pit lakes to flood water inputs.	25

### **FIGURES**

1.	DECORANA ordination showing the similarity of macroinvertebrate communities in gravel pit lakes in the Datchet-Chertsey complex.	16
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# **A SURVEY OF THE WETLAND PLANT AND MACROINVERTEBRATE COMMUNITIES OF SELECTED GRAVEL-PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX. - PHASE 2**

## **1. BACKGROUND**

This report forms the second part of a study of the aquatic plant and macroinvertebrate communities of gravel-pit lakes in the Datchet- Wraysbury-Staines-Chertsey (DWSC) area undertaken as part of the DWSC Flood Study.

In 1989 the macroinvertebrate and wetland plant communities of eight gravel-pit lakes in this area were surveyed (see previous Pond Action report: 'DWSC Flood Study: aquatic biology, 1990').

The present study describes the aquatic biology of a further ten lakes which were surveyed in autumn 1991. In addition, the macroinvertebrate community of one of the 1989 lakes (Wraysbury 2) was resurveyed in 1991 to indicate whether it was valid to compare and classify data collected in 1989 with that collected in 1991.

## **2. AIMS OF THE STUDY**

The study of selected lakes in the Datchet-Chertsey complex reported here had three main aims:

- (i) To describe the macroinvertebrate and wetland plant communities of the 10 lakes surveyed for the first time in 1991 and to determine whether differences existed between the communities of different lakes.
- (ii) To describe the nature conservation value of all of the 18 lakes (those surveyed in 1989 and 1991) in terms of their macroinvertebrate and wetland plant communities.
- (iii) To assess the sensitivity of the lake communities to potential impacts associated with inputs of river flood water.

## **2.2 WETLAND PLANTS**

A brief plant survey was undertaken in order to assess the quality of the wetland plant community of each lake. For each lake a species list was generated by rapidly walking the margins and recording wetland plants within the boundary of the lake banks. Submerged macrophytes were collected from areas near the bank, using a grapnel in deeper water. No attempt was made to map the extent of plant stands. The species recorded were those defined by the National Pond Survey wetland plant species list (see Appendix 8.1 of. DWSC Flood Study: Aquatic Biology, (1990)).

Plants species were identified in the field where possible, being taken back to the laboratory for microscopic examination where necessary. Standard keys and guides were used for identification (see References in.DWSC Flood Study: Aquatic Biology, (1990)).

It should be noted that since only a quick plant survey was undertaken in 1991 the results are not strictly comparable with the more detailed survey of 1989.

## **2.3 MACROINVERTEBRATE SAMPLING AND IDENTIFICATION**

### **2.3.1 Macroinvertebrate sampling**

As in the 1989 survey, the aims of macroinvertebrate sampling were:

- (i) to provide data for a DECORANA ordination analysis of differences in the macroinvertebrate communities of the lakes.
- (ii) to obtain species lists for each site which could be used to allow an assessment of the nature conservation value of the communities to be made.

Macroinvertebrate sampling techniques were similar to those used in the 1989 survey. Each lake was sampled using hand-nets for a total of three minutes, with the total sampling time divided equally between microhabitats. The sampling procedure was described in detail in DWSC Flood Study: Aquatic Biology, 1990.

There was one slight difference in methodology of the 1991 survey work: whereas in 1989 microhabitats were identified from vegetation maps of the lakes, for the 1991 survey microhabitats were chosen by visual examination of the site on the day of sampling.

A list of the microhabitats sampled is given in the individual descriptions of the macroinvertebrate communities of each lake (see Section 6).

### **2.3.2 Sorting and Identification of samples**

As in 1989, samples were taken back to the laboratory for sorting and identification, which was, where possible, to species level. Table 2 lists groups of invertebrates which were identified to species level in this study.

## **2.4 STATISTICAL ANALYSIS USING DECORANA**

Macroinvertebrate species and abundance data obtained from microhabitat sampling was analysed using the computer-based ordination technique DECORANA (detrended correspondence analysis). The data-set consisted of 298 microhabitat samples, all samples from 1989 and 1991 being analysed together (8 sites in 1989 and 11 sites in 1991).

An ordination diagram showing the inter-relationships of the macroinvertebrate communities of the lakes was plotted (using Axes 1 and 2 of DECORANA) (see Figure 1). The diagram was built-up from ordination plots of individual microhabitat samples from each lake.

DECORANA assesses the variation within a set of samples. The major source of variation in a sample set is described by the first axis of DECORANA. The second axis describes the major source of the variation not already described by the first axis. All axes of DECORANA are independent of each other. The amount of variation is represented in terms of units of standard deviation. Samples separated by 4 standard deviations (400 units on the scale of Figure 1) usually have no species in common (Hill, M.O. 1979b).

## **2.5 ASSESSMENT OF THE CONSERVATION VALUE OF THE LAKES**

### **2.5.1 Criteria used to assess the conservation value of the lakes**

The conservation value of lakes was assessed on the basis of:

- (i) the uncommonness of the plant or animal *community type* in the Datchet-Chertsey complex.
- (ii) the species-richness of the plant and invertebrate communities.

For aquatic plants species numbers were compared with the average numbers associated with community types in the NCC lake classification.

- (iii) the number of rare or local plant species recorded (definitions of 'rare' and 'local' are given in DWSC Flood Study: Aquatic Biology, 1990).

Sites with any of the following features were regarded as of **very high** conservation value:

- (i) Sites supporting plant or macroinvertebrate communities which were uncommon within the Datchet-Chertsey complex
- (ii) Sites supporting rare wetland plant species or Red Data Book macroinvertebrate species.

The conservation value of all the lakes was assessed using data from 1989 and 1991.

### **2.5.2 Definition of the terms 'rare' and 'local' as used in this report**

Definitions of the terms 'rare' and 'local' were given in DWSC Flood Study, 1990.

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**TABLE 2. MACROINVERTEBRATE GROUPS COLLECTED IN THE GRAVEL PIT LAKES AND IDENTIFIED TO SPECIES LEVEL.**

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Tricladida	(Flatworms)
Hirudinea	(Leeches)
Gastropoda	(Snails and limpets)
Bivalvia (excluding <u>Pisidium</u> spp.)	(Mussels)
Malacostraca	(Shrimps, slaters and bankhoppers)
Ephemeroptera	(Mayflies)
Odonata	(Dragonflies and damselflies)
Hemiptera	(Water bugs)
Megaloptera	(Alderflies)
Trichoptera	(Caddis flies)
Lepidoptera	(Moths)
Coleoptera*	(Beetles)

\*Adults from the following families of Coleoptera were identified: Dryopidae, Dytiscidae, Elminthidae, Gyrinidae, Haliplidae, Hydraenidae, Hydrophilidae, Hygrobiidae, Noteridae.

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### **3. RESULTS**

#### **3.1 THE WETLAND PLANT COMMUNITY**

##### **3.1.1 Numbers of species recorded**

81 wetland macrophyte species (excluding trees and shrubs) were recorded from the 10 lakes surveyed (see Appendix 1). 56 of these were marginal/emergent species and 25 aquatic (floating-leaved or submerged) plants. These were similar totals to those recorded in the 1989 study.

##### **3.1.2 Classification of the plant communities of the lakes surveyed in 1991**

Nine of the 10 lakes were classified as NCC 'Type 10' lakes on the basis of their aquatic plant communities. 'Type 10' lakes are eutrophic, lowland water bodies, rich in calcium. One site, Hythe End (Site E), was classified as an NCC 'Type 7' waterbody, largely on the basis of the presence of *Hippuris vulgaris* (maretail). This may be a misclassification since 'Type 7' sites are described as 'mainly coastal Scotland, especially Northern and Western Isles' (Palmer, 1989).

The aquatic plant species lists were also used to give a broad indication of the current nutrient status of the lakes using the Trophic Ranking Score (TRS) system of Palmer (1989). Using this system the 4 lakes, Leisure Sport 3 (Site A), Leisure Sport 2 (Site B), Longfield Farm (Site C) and Hythe End (Site E) had TRS values in the range 7.1-8.5 suggesting they are predominantly mesotrophic. Greenham 1, Shepperton Small and Ferry Lane (Sites G1, I and J) classify as mesotrophic/eutrophic with TRS values in the range 8.8-9.0. The other three lakes, Egham Hythe, Greenham Small and Shepperton Large (Sites F, G2 and H) classify as eutrophic waterbodies with TRS values in the range 9.5-9.6.

##### **3.1.3 Plant species-richness**

Species-richness was greatest in two of the largest lakes, Greenham 1 (Site G1) and Ferry Lane (Site J), with 41 species recorded in both lakes. One of the smallest lakes in the survey, Leisure Sport 3 (Site A), also supported a relatively species-rich flora for its size (36 species recorded). Leisure Sport 2 (Site B) supported the most impoverished flora recorded in any of the Datchet-Chertsey gravel pits to date (19 species) largely because of its very heavily shaded banks.

##### **Emergent and marginal vegetation**

The emergent and marginal plant communities present in the lakes were similar to those described in the 1989 report. Most emergent vegetation was limited in extent, typically restricted to a thin discontinuous fringe around the lake perimeter. Around most lakes more extensive lateral growth was inhibited by steep banks below and above water level, shade, and (in larger lakes) wave action.

Part of the north-western banks of Egham Hythe (Site F) supported areas of marginal fen vegetation adjacent to the lake edge.

##### **Floating-leaved and submerged vegetation**

All the sites supported stands of submerged vegetation. The most widespread species was *Elodea nuttallii* which was present in all the NCC Group 10 lakes and absent only from the Group 7 lake (Hythe End). *Potamogeton pectinatus* was also widespread within the lakes surveyed and was the dominant aquatic species in Egham Hythe (Site F). A number of other submerged species were also relatively widespread (occurring in three or four of the ten lakes). These included *Myriophyllum spicatum*, *Ceratophyllum demersum*, *Utricularia vulgaris*, *Potamogeton pusillus* and *Chara vulgaris* (see Table 3).

Five lakes supported rich aquatic plant communities, with species numbers above average for their community type (Palmer, 1989). These were: Leisure Sport 3 (Site A), Longfield Farm (Site C), Greenham 1 (Site G1), Shepperton Small (Site I) and Ferry Lane (Site J).

#### **3.1.4 Rare and local wetland plants**

One 'nationally rare' plant species, three 'regionally uncommon' species and 13 'local' species (6 marginal, 5 submerged and 1 floating-leaved) were recorded in the 10 lakes surveyed (see Table 4). All the sites surveyed supported at least one rare or local wetland plant. Descriptions of the national distributions of these species are given in Appendix 2.

Leisure Sport 3 (Site A) and Ferry Lane (Site J) each supported two species which are in need of special protection in the Thames catchment (*Hottonia palustris*/*Ranunculus lingua* and *Rumex palustris* /*Juncus compressus*, respectively). Greenham 1 (Site G1) also supports stands of *R. palustris* as well as 6 other local or locally common plant species.

##### **Uncommon marginal and emergent plants**

One rare marginal plant, *Juncus compressus* (round-fruited rush), was found in low abundance along the northern margin of Ferry Lane (Site J).

The regionally uncommon species, *Rumex palustris*, was recorded from both Ferry Lane (Site J) and Greenham 1 (Site G1) growing predominantly in shallow water around the edges of the lakes. Leisure Sport 3 (Site A) was notable for supporting a single plant of *Ranunculus lingua*. However, since *R. lingua* is now widely available in garden centres so this plant may have been a garden escape.

Greenham 1 (Site G1) supported by far the greatest number of local marginal species (6), and was the only lake from which *Butomus umbellatus* was recorded.

##### **Uncommon aquatic species**

One regionally uncommon aquatic plant, *Hottonia palustris*, was recorded. This species was present in moderate abundance in Leisure Sport 3 (Site A).

The group of lakes in the Longfield Farm and Hythe End area (Sites A, B, C and E) were particularly notable in supporting a relatively high number of local submerged species. Three of these lakes were exceptional in supporting good stands of *Utricularia vulgaris*. The fourth, Longfield Farm (Site C), also supported *U. vulgaris* but only in low abundance. Other local species included *Ceratophyllum demersum*, *Hippuris vulgaris* and (as above) *Hottonia palustris*.

One uncommon floating-leaved plant, *Lemna polyrrhyza*, was recorded. This species was present in very low abundance in Ferry Lane (Site J) where it had almost certainly colonised from the adjacent River Thames.

**TABLE 3. AQUATIC PLANT SPECIES RECORDED IN 10 GRAVEL-PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX.**

LAKE	A	B	C	E	F	G1	G2	H	I	J
<i>Azolla filiculoides</i>	-	-	-	-	-	+	-	-	-	+
<i>Callitriche</i> sp.	-	-	-	-	-	-	-	-	-	+
<i>Ceratophyllum demersum</i>	-	+	+	-	-	-	-	+	-	-
<i>Chara vulgaris</i>	-	+	-	-	-	-	-	-	+	-
<i>Chara vulgaris</i> var. <i>longibract.</i>	+	-	-	-	-	-	-	-	-	-
<i>Elodea nuttallii</i>	+	+	+	-	+	+	+	+	+	+
<i>Fontinalis antipyretica</i>	-	+	-	-	-	-	-	-	-	-
<i>Glyceria fluitans</i>	-	-	+	-	-	-	-	-	-	-
<i>Hippuris vulgaris</i>	-	-	-	+	-	-	-	-	-	-
<i>Hottonia palustris</i>	+	-	-	-	-	-	-	-	-	-
<i>Lemna minor</i>	-	-	+	-	-	+	-	+	+	+
<i>Lemna minuscule</i>	-	-	+	-	-	-	-	-	-	+
<i>Lemna polyrhiza</i>	-	-	-	-	-	-	-	-	-	+
<i>Lemna trisulca</i>	+	-	+	-	-	-	-	-	-	-
<i>Myriophyllum spicatum</i>	-	-	-	+	-	+	+	+	-	-
<i>Nymphaea alba</i>	+	-	-	+	-	+	-	-	-	+
<i>Nuphar lutea</i>	+	-	-	+	-	+	-	-	-	-
<i>Polygonum amphibium</i>	+	-	+	-	+	+	+	+	+	+
<i>Potamogeton berchtoldii</i>	-	-	-	+	-	-	-	-	+	+
<i>Potamogeton crispus</i>	+	-	-	-	-	-	-	-	+	-
<i>Potamogeton pectinatus</i>	+	-	+	+	+	+	+	+	+	-
<i>Potamogeton pusillus</i>	-	-	-	-	-	+	-	-	-	-
<i>Ranunculus</i> sp.	+	-	-	-	-	-	-	-	+	-
<i>Sparganium emersum</i>	+	-	-	-	-	-	-	-	-	-
<i>Utricularia vulgaris</i>	+	+	+	+	-	-	-	-	-	-
<i>Zannichellia palustris</i>	-	-	-	-	-	-	-	-	+	-
<b>Total species.</b>	<b>12</b>	<b>5</b>	<b>9</b>	<b>7</b>	<b>3</b>	<b>8</b>	<b>4</b>	<b>6</b>	<b>9</b>	<b>9</b>
<b>Average number of species for NCC lake community type (Palmer 1989)</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>7</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>

**TABLE 4. RARE AND LOCAL WETLAND PLANT SPECIES RECORDED IN 10 GRAVEL-PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX.**

\* Regionally uncommon plant species listed by Palmer and Newbold (1983) as being in need of special protection in the Thames Catchment

**AQUATIC SPECIES**

	<b><u>LAKES</u></b>									
	<b>A</b>	<b>B</b>	<b>C</b>	<b>E</b>	<b>F</b>	<b>G1</b>	<b>G2</b>	<b>H</b>	<b>I</b>	<b>J</b>
<b><u>Local</u></b>										
<i>Ceratophyllum demersum</i>	-	+	+	-	-	-	-	+	-	-
<i>Hippuris vulgaris</i>	-	-	-	+	-	-	-	-	-	-
<i>Hottonia palustris</i> *	+	-	-	-	-	-	-	-	-	-
<i>Lemna polyrhiza</i>	-	-	-	-	-	-	-	-	-	+
<i>Myriophyllum spicatum</i>	-	-	-	+	-	+	+	+	-	-
<i>Utricularia vulgaris</i>	+	+	+	+	-	-	-	-	-	-
<i>Zannichellia palustris</i>	-	-	-	-	-	-	-	-	+	-
<b>Total local aquatic species</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>

**MARGINAL SPECIES**

	<b><u>LAKES</u></b>									
	<b>A</b>	<b>B</b>	<b>C</b>	<b>E</b>	<b>F</b>	<b>G1</b>	<b>G2</b>	<b>H</b>	<b>I</b>	<b>J</b>
<b><u>Rare</u></b>										
<i>Juncus compressus</i>	-	-	-	-	-	-	-	-	-	+
<b>Total rare marginal species.</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b><u>Local</u></b>										
<i>Bidens cernua</i>	-	-	+	-	-	-	-	-	-	-
<i>Bidens tripartita</i>	-	-	-	-	-	+	+	-	-	+
<i>Butomus umbellatus</i>	-	-	-	-	-	+	-	-	-	-
<i>Lysimachia vulgaris</i>	-	-	-	-	-	+	-	-	-	-
<i>Ranunculus lingua</i> *	+	-	-	-	-	-	-	-	-	-
<i>Rorippa amphibia</i>	-	-	-	-	-	+	+	-	-	+
<i>Rumex palustris</i> *	-	-	-	-	-	+	-	-	-	+
<i>Typha angustifolia</i>	+	-	-	-	+	+	+	-	-	-
<b>Total local marginal species.</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **3.2 THE MACROINVERTEBRATE COMMUNITY**

#### **3.2.1 Species richness and composition of the fauna**

160 macroinvertebrate species were recorded from the eleven sites surveyed (see Table 5).

A list of the species recorded at each of the sites is given in Appendix 4.

Individual sites supported between 47 species (Egham Hythe, Site F) and 103 species (Wraysbury 2, Site W) of macroinvertebrates (see Table 5).

#### **3.2.2 Rare and local species**

Two nationally rare species were recorded, the caddis fly *Leptocerus lusitanicus* (RDB2) and the water beetle *Oulimnius major* (RDB3). *Leptocerus lusitanicus* was only found in Wraysbury 2 in 1989 but was recorded in 9 of the lakes during this survey, being apparently absent only from Egham Hythe (Site F) and Ferry Lane (Site J).

The water beetle *Oulimnius major* (also found only in Wraysbury 2 in 1989), was recorded in Wraysbury 2 and Longfield Farm (Site C) in 1991. In addition, females apparently of this species were also found in Leisure Sport 2 (Site B) and Shepperton Small (Site H), but males are required for positive identification.

A species of water snail believed to be new to Britain and provisionally identified as *Lithoglyphus naticoides*, was recorded in Longfield Farm (Site C) and Hythe End (Site E). Specimens are currently being checked by Dr. M.P. Kerney of the British Museum (Natural History).

In all, 23 local macroinvertebrate species were recorded from the 11 sites and every lake supported at least one local species (see Table 6 below.). Shepperton Large (Site H) and Wraysbury 2 (Site W) supported the largest number of local species, with 12 each. The smallest number of local species (4) was recorded in Shepperton Small (Site I).

**TABLE 5. THE NUMBER OF SPECIES IN MAJOR TAXA RECORDED IN ELEVEN GRAVEL PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX**

The following abbreviations are used:

A	Leisure Sport 3	G1	Greenham 1
B	Leisure Sport 2	G2	Greenham 2
C	Longfield Farm	H	Shepperton Large
E	Hythe End	I	Shepperton Small
F	Egham Hythe	J	Ferry Lane
W	Wraysbury 2		

	A	B	C	E	F	G1	G2	H	I	J	W	TOTAL
TRICLADIDA	2	2	1	2	2	2	1	2	2	2	2	4
HIRUDINEA	1	1	4	4	1	3	1	3	3	4	7	8
GASTROPODA	16	13	16	12	9	14	15	18	15	16	22	25
BIVALVIA	2	1	2	-	1	4	2	1	1	3	5	7
ARACHNIDA	1	-	-	-	-	-	-	-	-	-	-	1
CRUSTACEA	2	2	4	4	2	3	3	4	3	5	4	6
EPHEMEROPTERA	3	4	3	2	2	4	3	3	4	3	5	5
ODONATA	5	2	7	7	2	5	3	5	3	3	5	10
HETEROPTERA	6	8	13	10	5	5	2	13	8	8	13	24
MEGALOPTERA	1	1	1	1	-	1	1	1	1	1	1	1
TRICHOPTERA	13	10	12	15	6	12	12	13	8	8	21	27
LEPIDOPTERA	1	1	1	1	-	-	-	1	1	-	1	1
COLEOPTERA	8	14	14	9	17	18	15	19	14	13	17	41
<b>TOTAL</b>	<b>61</b>	<b>59</b>	<b>78</b>	<b>67</b>	<b>47</b>	<b>71</b>	<b>58</b>	<b>83</b>	<b>63</b>	<b>66</b>	<b>103</b>	<b>160</b>

**TABLE 6. RARE AND LOCAL MACROINVERTEBRATE SPECIES RECORDED IN ELEVEN GRAVEL PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX**

The following abbreviations are used:

A	Leisure Sport 3	G1	Greenham 1
B	Leisure Sport 2	G2	Greenham 2
C	Longfield Farm	H	Shepperton Large
E	Hythe End	I	Shepperton Small
F	Egham Hythe	J	Ferry Lane
W	Wraysbury 2		

Note: (+) indicates that *Oulimnius major* is probably present, but that females only were recorded (males are required for certain identification.)

	A	B	C	E	F	G1	G2	H	I	J	W
<b>RARE SPECIES</b>											
<b>TRICHOPTERA</b>											
Leptocerus lusitanicus	+	+	+	+	-	+	+	+	+	-	+
<b>COLEOPTERA</b>											
Oulimnius major	-	(+)	+	-	-	-	-	-	(+)	-	+
<b>LOCAL SPECIES</b>											
<b>GASTROPODA</b>											
Bithynia leachi	+	-	+	+	-	+	+	+	+	-	+
Gyraulus laevis	+	+	-	-	-	-	-	+	-	+	+
<b>BIVALVIA</b>											
Dreissena polymorpha	-	+	+	-	+	+	+	+	+	+	+
Unio tumidus	-	-	-	-	-	-	-	-	-	-	+
<b>CRUSTACEA</b>											
Orchestia cavimana	-	-	-	-	-	+	+	-	-	-	-
<b>ODONATA</b>											
Erythromma najas	+	-	+	+	-	+	+	+	-	+	+
Anax imperator	-	-	+	+	+	-	-	+	-	-	+
<b>HETEROPTERA</b>											
Corixa dentipes	-	-	-	-	-	-	-	+	-	-	-
Corixa panzeri	-	-	-	-	-	-	-	-	-	+	+
Gerris argentatus	-	-	+	+	-	-	-	-	+	-	-
Micronecta scholtzi	-	-	-	-	-	+	-	-	-	-	-
Ranatra linearis	-	-	+	+	-	-	-	+	+	+	+
Sigara concinna	-	+	+	+	-	-	-	-	-	-	-

**TABLE 6. RARE AND LOCAL MACROINVERTEBRATE SPECIES RECORDED IN  
(cont.) ELEVEN GRAVEL PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX**

The following abbreviations are used:

A	Leisure Sport 3	G1	Greenham 1
B	Leisure Sport 2	G2	Greenham 2
C	Longfield Farm	H	Shepperton Large
E	Hythe End	I	Shepperton Small
F	Egham Hythe	J	Ferry Lane
W	Wraysbury 2		

Note: (+) indicates that *Oulimnius major* is probably present, but that females only were recorded (males are required for certain identification.)

	A	B	C	E	F	G1	G2	H	I	J	W
<b>TRICHOPTERA*</b>											
<i>Agraylea sexmaculata</i>	-	-	+	+	-	+	-	+	-	-	+
<i>Ecnomus tenellus</i>	-	-	-	+	+	-	+	-	-	-	+
<i>Oecetis testacea</i>	+	-	-	-	-	-	-	-	-	-	-
<i>Phryganea grandis</i>	+	-	-	-	+	-	-	+	-	-	+
<b>COLEOPTERA</b>											
<i>Enochrus melanocephalus</i>	-	-	-	-	-	-	-	+	-	-	-
<i>Haliphus confinis</i>	-	+	-	-	+	+	+	+	-	+	+
<i>Haliphus obliquus</i>	-	-	+	-	-	-	-	-	-	-	-
<i>Hygrobia hermanni</i>	-	-	-	-	-	-	-	-	-	+	-
<i>Ilybius fenestratus</i>	+	+	-	+	+	+	+	+	-	+	-
<b>TOTAL RARE AND LOCAL SPECIES</b>	<b>7</b>	<b>7</b>	<b>11</b>	<b>10</b>	<b>6</b>	<b>9</b>	<b>8</b>	<b>13</b>	<b>5</b>	<b>8</b>	<b>14</b>

\*Trichoptera: Three species listed as local in the previous report (see DWSC Flood Study, 1990), *Cyrnus flavidus*, *Holocentropus dubius* and *Lype reducta*, are now considered more common than was previously thought. Therefore, though still present, they have not been listed as local species. (Wallace, 1991.)



### 3.2.3 The similarity of the macroinvertebrate communities in the lakes

#### Introduction

The DECORANA analysis was run with the sites from both 1989 and 1991 surveys. Polygons enclosing the microhabitats from the 18 lakes are shown on the ordination diagram given in Figure 1. Two polygons are shown for Wraysbury 2, which was surveyed in both years.

1989 sites are shown on the overlay, with 1991 sites on the base sheet. The similarity of the lake communities is indicated by the extent to which the polygons overlap.

#### Wraysbury 2 (1989 and 1991 surveys).

The 1991 polygon for Wraysbury 2 almost completely encloses the 1989 polygon. This strongly suggests that the community in this lake remained relatively stable between the two survey periods. It suggests that it is legitimate to make a comparison between the lakes surveyed in 1989 and 1991.

#### DECORANA groups

DECORANA analysis indicated that the 18 lakes could be subdivided into three different groups according to the macroinvertebrate community type they supported. These were:

TYPE A COMMUNITY	1989 sites.	Sunnymeads, Kingsmead New, Wraysbury 2, ARC 1, Thorpe Park, Sheepwalk East.
	1991 sites.	Egham Hythe (Site F), Greenham 1 (Site G1), Greenham 2 (Site G2), Shepperton Large (Site H) and Shepperton Small (Site I).

This group included sites with polygons which largely overlapped each other suggesting that they supported very similar macroinvertebrate communities. The group included the six original 1989 Group A sites (Sunnymeads, Kingsmead New, Wraysbury No. 2, ARC No. 1, Thorpe Park and Sheepwalk East: see DWSC Flood Study, 1990) and a further 5 sites surveyed in 1991 (Egham Hythe, Greenham 1, Greenham 2, Shepperton Large and Shepperton Small).

TYPE B COMMUNITY	1989 sites	Datchet Common Central Lake, Kingsmead Main.
	1991 sites	Hythe End (Site E), Ferry Lane (Site J).

In the new DECORANA analysis Type B communities had polygons extended to the left of the main Type A polygons (see Figure 1). Of the group Datchet Common Central (surveyed in 1989) remained the most distinctive, other sites showing more overlap with Type A communities.

TYPE C COMMUNITY	1991 sites.	Leisure Sport 2 (Site B), Leisure Sport 3 (Site A) and Longfield Farm (Site C).
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Polygons describing these communities extend to the right of the Type A polygons (see Figure 1). Although there is a little overlap with Type A lakes, the macroinvertebrate communities in most microhabitats were distinctly different from Type A microhabitat communities. This probably reflected the presence of a number of microhabitat types (eg stands of *Utricularia* and *Hottonia*) which were not present in other lakes.

#### **4. ASSESSMENT OF THE NATURE CONSERVATION VALUE OF WETLAND PLANT AND AQUATIC MACROINVERTEBRATE COMMUNITIES IN 18 GRAVEL-PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX**

##### **4.1 INTRODUCTION**

The following assessment of conservation value for the lakes in the Datchet complex includes the results of both the 1989 and 1991 surveys. In some cases the assessment of the 1989 survey has been slightly modified in the light of further information gathered during 1991.

The conservation value of each lake was assessed on the basis of 3 features: community type, species-richness and presence of rare or local species. The methods are summarised in Section 2.5, and the results in Table 6. Using these three criteria the lakes have been designated either (i) Very High, (ii) High or (iii) Moderate conservation value. None of the lakes were of Low conservation value.

As in 1989 all the lakes supported either rare or local plants and animals, indicating the general importance of gravel pit lakes for wetland wildlife.

##### **4.2 LAKES OF VERY HIGH CONSERVATION VALUE**

**Leisure Sport 3 (Site A), Leisure sport 2 (Site B), Longfield Farm (Site C) and Hythe End (Site E), Datchet Common Central, Sunnymeads, Wraysbury 2, Greenham 1 (Site G1), Greenham 2 (Site G2), Shepperton Large (Site H), Shepperton Small (Site I), Ferry Lane (Site J).**

**Leisure Sport 3, Leisure sport 2, Longfield Farm, Hythe End and Datchet Common Central** are listed in this group because they supported unusual plant and/or invertebrate communities for the area. This probably reflected their status as mesotrophic lakes. In addition all of the lakes (except Datchet Common Central) supported at least one rare invertebrate species. Leisure Sport 3 (Site A) also supported two marginal plants which are 'in need of protection in the Thames catchment' (Palmer and Newbold, 1983).

**Sunnymeads, Wraysbury 2, Greenham 1, Greenham 2, Shepperton Large, Shepperton Small and Ferry Lane** are listed in this group because of the presence of one or more rare plant and/or invertebrate species. Of these lakes Wraysbury 2 was notable in both the 1989 and 1991 surveys for supporting a particularly rich invertebrate fauna with the largest total number of species, the largest number of local species and 2 rare invertebrate species.

It should also be noted that three of the lakes in this group (**Greenham 1, Greenham 2 and Shepperton Large**) are only listed here because of the presence of *Leptocerus lusitanicus*. If the status of *L. lusitanicus* were to change, the conservation value of these lakes would be downgraded from Very High to High.

#### **4.3 LAKES OF HIGH CONSERVATION VALUE**

##### **Egham Hythe (Site F), Thorpe Park Lakes, Sheepwalk East.**

These sites were of High conservation value because they supported one or more of the following:

- (i) Plants of regional importance ie those listed in Palmer and Newbold as being in need of protection in the Thames catchment (**Thorpe Park Lakes, Sheepwalk East**).
- (ii) Unusually diverse aquatic plant communities for their NCC classification type (Palmer,1989) (**Thorpe Park Lakes**).
- (iii) Large numbers of local plant and/or invertebrate species (**Thorpe Park Lakes**).

#### **4.4 LAKES OF INTERMEDIATE CONSERVATION VALUE**

##### **ARC No.1, Kingsmead Main, Kingsmead New.**

These lakes supported below average numbers of submerged plant species for their NCC Community Group and low to moderate numbers of local plant or invertebrate species.

**Kingsmead Main** was near the border of becoming of High conservation value because of the presence of relatively high numbers of local invertebrate species.

**TABLE 7. CRITERIA USED TO ASSESS CONSERVATION VALUE OF THE GRAVEL PIT LAKES.**

SITE (1989 SURVEY)	WATER QUALITY (based on TRS score)	PLANT COMMUNITIES				INVERTEBRATE COMMUNITITES			OVERALL CONSERVA- TION VALUE
		NCC Community type	No. of aquatic spp compared with NCC community type	Number of uncommon species	Conserva- tion value	Number of uncommon species	DECORANA Community type	Conserva- tion value	
<b>Datchet Common Central</b>	Mesotrophic	7	Average	1 local	Very High	6 local	B	High	<b>Very High</b>
<b>Sunnymeads</b>	Eutrophic	10	Below Average	1 rare/ 4 local	Very High	-	A	Low	<b>Very High</b>
<b>Kingsmead Main</b>	Mesotrophic	10	Below Average	2 local	Intermediate / low	7 local	B	Intermediate/ High	<b>Intermediate</b>
<b>Kingsmead New</b>	Meso/Eutro	10	Average	3 local	Intermediate	2 local	A	High	<b>Intermediate</b>
<b>Wraysbury No.2</b>	Meso/Eutro	10	Well Above Average	6 local	High	2 rare/ 12 local	A	Very High	<b>Very High</b>
<b>ARC No. 1</b>	Eutrophic	10	Below Average	4 local	Intermediate	4 local	A	High	<b>Intermediate</b>
<b>Thorpe Park</b>	Meso/Eutro	10	Well Above Average	10 local	High	8 local	A	High	<b>High</b>
<b>Sheepwalk East</b>	Eutrophic	10	Below Average	5 local	Very high	2 local	A	High	<b>High</b>

**TABLE 7. CRITERIA USED TO ASSESS CONSERVATION VALUE OF THE GRAVEL PIT LAKES (continued).**

SITE (1991 SURVEY)	WATER QUALITY (based on TRS score)	PLANT COMMUNITIES				INVERTEBRATE COMMUNITITES			OVERALL CONSERVA- TION VALUE
		NCC Community type	No. of aquatic spp. compared with NCC community type	Number of uncommon species	Conserva- tion value	Number of uncommon species	DECORANA Community type	Conserva- tion value	
<b>A Leisure Sport 3</b>	Mesotrophic	10	Well Above Average	4 local	Very High	1 rare/ 6 local	C	Very High	<b>Very High</b>
<b>B Leisure Sport 2</b>	Mesotrophic	10	Below Average	2 local	Intermediate	2 rare/ 5 local	C	Very High	<b>Very High</b>
<b>C Longfield Farm</b>	Mesotrophic	10	Above Average	3 local	High	2 rare/ 9 local	C	Very High	<b>Very High</b>
<b>E Hythe End</b>	Mesotrophic	7	Below Average	3 local	High	1 rare/ 9 local	B	Very High	<b>Very High</b>
<b>F Egham Hythe</b>	Eutrophic	10	Well Below Average	1 local	Low	6 local	A	High	<b>High</b>
<b>G1 Greenham 1</b>	Meso/Eutro	10	Above Average	7 local	Very High	1 rare/ 8 local	A	Very High	<b>Very High</b>
<b>G2 Greenham 2</b>	Eutrophic	10	Below Average	4 local	Intermediate	1 rare/ 7 local	A	Very High	<b>Very High</b>
<b>H Shepperton Large</b>	Eutrophic	10	Average	2 local	Intermediate	1 rare/ 12 local	A	Very High	<b>Very High</b>
<b>I Shepperton Small</b>	Meso/Eutro	10	Above Average	1 local	High	2 rare/ 3 local	A	Very High	<b>Very High</b>
<b>J Ferry Lane</b>	Meso/Eutro	10	Above Average	1 rare/ 4 local	Very High	8 local	B	Very High	<b>Very High</b>

## **5. THE SENSITIVITY OF THE LAKES TO FLOOD WATER INPUTS**

### **5.1 INTRODUCTION**

Sensitivity is taken to mean '*the likelihood of plant and animal communities changing in an undesired way in response to flood water inputs*'.

Lakes have been regarded as 'sensitive' if they:

- (i) have features which it is desirable to retain (in this instance nature conservation interest).
- (ii) their plant and animal communities are clearly vulnerable to modification by the flood water inputs, or the physical construction of flood channels.

The sensitivity of the 18 lakes to flood water inputs is summarised in Map 2 and in Table 7.

The potential effects of flood water were reviewed in DWSC Flood Study 1990 and the main impacts likely to result from flood water inputs into the lakes were listed in Table 11 of that report. Five main areas of change were identified:

- (i) increased nutrient loading (directly changing water quality)
- (ii) increased sediment loading
- (iii) introduction of river plants and animals
- (iv) changes in water level
- (v) physical damage to microhabitats

As in the 1989, no independent water quality data was available from the lakes to help refine the sensitivity analysis.

### **5.2 WATER QUALITY AND PHYSICAL DAMAGE**

#### **5.2.1 Water quality**

Lakes with Type B and C invertebrate communities (mainly the mesotrophic lakes) are the most likely to be vulnerable to water quality changes (impacts (i) and (ii) above).

Particular efforts should be made to prevent water quality deterioration in the mesotrophic lakes supporting Type C communities, especially Leisure Sport 3 (Site A) and 2 (Site B) and Hythe End (Site E). It is notable that Longfield Farm (Site C), which already has a small inflow, only supported a very limited population of *Utricularia vulgaris*. This provides some evidence that the group of mesotrophic lakes may be sensitive to the effects of inflow water.

The more eutrophic lakes supporting Type A macroinvertebrate communities seem less likely to be vulnerable to water quality impacts. However without manipulation and experimental work the effect of floodwater on these lakes remains unclear and the possibility that significant damage to their communities might occur, cannot be ruled out.

### 5.2.2 Protecting populations of rare or uncommon species from physical damage

Specific measures to protect populations of rare or uncommon species from any physical damage during the construction of a flood channel would be necessary at a number of lakes:

#### **Plants**

- |                       |   |
|-----------------------|---|
| (i) Ferry Lane        | <i>Juncus compressus</i> growing in small areas of the northern margin.<br><i>Rumex palustris</i> growing on the southern margin. |
| (ii) Greenham 1       | <i>Rumex palustris</i> : growing on parts of the southern and western margin.   |
| (iii) Leisure Sport 3 | <i>Ranunculus lingua</i> growing locally on the northern margin.  |
| (iv) Sheepwalk East   | <i>Rumex palustris</i> (see DWSC Flood Study, 1990).  |
| (v) Sunnymeads        | <i>Juncus compressus</i> (see DWSC Flood Study, 1990).  |
| (vi) Thorpe Park      | <i>Scirpus maritimus</i> ( though this may have been planted at the site). See also DWSC Flood Study, 1990.                       |

#### **MacroInvertebrates**

At lakes supporting populations of *Leptocerus lusitanicus* measures should be taken to ensure that bankside willows (especially with roots growing in the water) are maintained.

**TABLE 8. SENSITIVITY OF THE GRAVEL PIT LAKES TO RIVER FLOOD WATER INPUTS.**

SITE (1989 SURVEY)	SENSITIVITY TO FLOOD WATER INPUTS					PHYSICAL DAMAGE TO COMMUNITITES DURING CONSTRUCTION	OVERALL SENSITIVITY
	Water quality change	Increased sediment load	Plant and animal introductions	Water level Changes	Overall Sensitivity to flood water		
<b>Datchet Common Central</b>	High	High	High	Low	<b>High</b>	Low	<b>High</b>
<b>Sunnymeads</b>	Low	?Moderate	Low	Low	<b>?Moderate</b>	Locally High	<b>Locally High</b>
<b>Kingsmead Main</b>	?moderate/ High	?Moderate	?Moderate	Low	<b>?Moderate</b>	Low	<b>?Moderate</b>
<b>Kingsmead New</b>	?Moderate	?Moderate	Low	Low	<b>?Moderate</b>	Low	<b>?Moderate</b>
<b>Wraysbury No.2</b>	?Moderate	?Moderate	Low	Low	<b>?Moderate</b>	Low	<b>?Moderate</b>
<b>ARC No. 1</b>	Low	?Moderate	Low	Low	<b>?Moderate</b>	Low	<b>?Moderate</b>
<b>Thorpe Park</b>	?Moderate	?Moderate	Low	Low	<b>?Moderate</b>	Locally Moderate	<b>?Moderate</b>
<b>Sheepwalk East</b>	Low	?Moderate	Low	Low	<b>?Moderate</b>	Locally High	<b>Locally High</b>



**TABLE 8. SENSITIVITY OF THE GRAVEL PIT LAKES TO FLOOD WATER INPUTS (CONTINUED).**

SITE	SENSITIVITY TO FLOOD WATER INPUTS					PHYSICAL DAMAGE TO COMMUNITIES DURING CONSTRUCTION	OVERALL SENSITIVITY
	Water quality change	Increased sediment load	Plant and animal introductions	Water level Changes	Overall Sen- sitivity to flood water		
<b>A Leisure Sport 3</b>	High	?Moderate	?Moderate	Low	High	Locally high	High
<b>B Leisure Sport 2</b>	High	?Moderate	?Moderate	Low	High	Low	High
<b>C Longfield Farm</b>	High	?Moderate	?Moderate	Low	High	Low	High
<b>E Hythe End</b>	High	?Moderate	?Moderate	Low	High	Low	High
<b>F Egham Hythe</b>	Low	?Moderate	Low	Low	Low	Locally moderate	Locally moder- ate
<b>G1 Greenham 1</b>	Moderate	?Moderate	Low	Low	Moderate	Locally high	Locally high
<b>G2 Greenham 2</b>	Low	?Moderate	Low	Low	Low	Low	Low
<b>H Shepperton Large</b>	Low	?Moderate	Low	Low	Low	Low	Low
<b>I Shepperton Small</b>	Moderate	?Moderate	Low	Low	Moderate	Low	Moderate
<b>J Ferry Lane</b>	Moderate	?Moderate	Low	Low	Moderate	Locally High	Moderate

## 6. BRIEF DESCRIPTIONS OF THE MACROINVERTEBRATE COMMUNITIES OF INDIVIDUAL LAKES

### 6.1 LEISURE SPORT 3 (SITE A)

61 macroinvertebrate species were recorded from the lake, including 6 local and 1 rare species, a relatively rich community for such a small site.

Macroinvertebrates were collected from the following microhabitats (arranged in order of species richness):

MICROHABITAT	NUMBER OF SPECIES
<i>Mentha aquatica</i>	37
<i>Utricularia vulgaris</i> .	35
<i>Typha</i> spp.	32
<i>Hottonia palustris</i>	31
<i>Carex</i> spp.	25
Willows	25
<i>Elodea nuttallii</i>	14
Water lilies	9

The dominant species numerically was the snail *Potamopyrgus jenkinsi* (Jenkins' Spire Shell), of which some 3000 individuals were collected in the sample. Snails in general were well represented, with 16 species being present. Caddis flies were also well represented, with 13 species recorded.

The microhabitats showed a sharp division in terms of species-richness, *Mentha* and *Utricularia* being particularly species-rich and the *Elodea* and water lilies being relatively species-poor.

Leisure Sport 3 supported the rare caddis fly *Leptocerus lusitanicus* and 6 local species: the snails *Bithynia leachi* (Leach's Bithynia) and *Gyraulus laevis* (the Smooth Ramshorn), *Erythromma najas* (the Red-eyed Damselfly), the leptocerid caddis *Oecetis testacea*, the phryganeid caddis *Phryganea grandis*, and the diving beetle *Ilybius fenestratus*.

On the basis of the presence of the RDB2 species *Leptocerus lusitanicus*, Leisure Sport 3's macroinvertebrate community is of very high nature conservation value.

## 6.2 LEISURE SPORT 2 (SITE B)

59 macroinvertebrate species were recorded from the lake, 5 of which were local and 1 rare.

Macroinvertebrates were collected from the following microhabitats:

MICROHABITAT	NUMBER OF SPECIES
Willow roots	32
Sand/gravel	26
<i>Utricularia vulgaris</i> .	23
<i>Sparganium erectum</i> .	23
Grassy edges	22
Composite	18
<i>Ceratophyllum demersum</i> .	16
<i>Carex</i> spp.	14

The willows were particularly species-rich, although interestingly the *Ceratophyllum* proved to be the best habitat for the RDB species *Leptocerus lusitanicus*: 8 individuals were found in the willow sample, but 60 were collected from the *Ceratophyllum*. *Leptocerus lusitanicus* has long been known to favour willow roots (Wallace, 1991), but during the DWSC Flood Study the species has been found in several new microhabitats.

The most abundant species present was *Gyraulus laevis* (the Smooth Ramshorn), with over 700 individuals in the sample. Again, this is interesting since *G. laevis* is a local species. By far the largest number of individuals of this species were found in submerged vegetation, i.e. the *Ceratophyllum* and the *Utricularia*.

4 other local species were also recorded: *Dreissena polymorpha* (the Zebra Mussel), *Sigara concinna* (a lesser water boatman), *Ilybius fenestratus* (a diving beetle), and *Haliphus confinis* (a halipid water beetle).

The macroinvertebrate community of Leisure Sport 2 is of very high nature conservation value.

### 6.3 LONGFIELD FARM LAKE (SITE C)

78 macroinvertebrate species were recorded from the lake, including 2 rare and 9 local species. The community is relatively species-rich for a site of this size. In addition, a snail apparently new to Britain was found. This snail has been tentatively identified as *Lithoglyphus naticoides*, but this identification has yet to be confirmed (see Appendix 5 for more information).

Macroinvertebrates were collected from the following microhabitats:

MICROHABITAT	NUMBER OF SPECIES
Willows	42
Grassy edges	40
Sand/gravel	38
<i>Juncus inflexus</i> .	36
Submerged vegetation	34
Herb edges	32
Various emergents	32
Floating-leaved vegetation	22

All the microhabitats were rich in species, except for floating-leaved vegetation. Snails and caddis flies were well represented, with 16 and 12 species recorded respectively.

In view of the closeness of this lake to Leisure Sport 2 (Site B), it is interesting that 7 species of dragonfly and damselfly were recorded in Longfield Farm lake, compared to only 2 in Leisure Sport 2. Similarly, 9 species of water bugs were recorded in Longfield Farm which did not appear in the population of Leisure Sport 2.

It was notable that the most abundant species in Longfield Farm lake was the RDB2 species *Leptocerus lusitanicus*, of which over 1000 individuals were recorded. These were mainly found, as would have been expected, among the willow roots; however, a smaller number of individuals was also recorded in every other microhabitat sampled.

In addition to *Leptocerus lusitanicus*, 1 other rare species, the riffle beetle *Oulimnius major*, was recorded. 9 local species were also recorded: *Bithynia leachi* (Leach's Bithynia), *Dreissena polymorpha* (the Zebra Mussel), *Erythromma najas* (the Red-eyed Damselfly), *Anax imperator* (the Emperor Dragonfly), *Gerris argentatus* (a pond skater), *Ranatra linearis* (the Water Stick Insect), *Sigara concinna* (a lesser water boatman), *Agraylea sexmaculata* (a caddis larva), and *Halipus obliquus* (a halipid water beetle).

The macroinvertebrate community of Longfield Farm lake is of very high nature conservation value.

#### 6.4 HYTHE END (SITE E)

67 macroinvertebrate species were recorded from the lake, with 1 of these being rare and 9 local. The snail tentatively identified as *Lithoglyphus naticoides* was also found at this site (see Appendix 5).

The microhabitats sampled were:

MICROHABITAT	NUMBER OF SPECIES
<i>Sparganium erectum</i> .	32
Herb edges	31
<i>Phragmites australis</i>	28
<i>Hippuris vulgaris</i>	23
Willows	23
<i>Utricularia vulgaris</i> . (shallow)	20
Sand/gravel	16
<i>Utricularia vulgaris</i> . (deep)	12

The dominant species numerically was the flatworm *Dugesia tigrina*, with over 1000 individuals collected in the sample. Most of these were concentrated in the shallow *Utricularia* and the willows. The snail *Physa acuta* (a bladder snail) was also very abundant.

Trichoptera were well represented, with 15 species recorded.

Hythe End supported the rare caddis fly *Leptocerus lusitanicus*. In addition, females which appeared to be of the RDB3 species *Oulimnius major* were found (males are required for definite identification).

In addition, 9 local species were found. These were: *Bithynia leachi* (Leach's Bithynia), *Erythromma najas* (the Red-eyed Damselfly), *Anax imperator* (the Emperor Dragonfly), *Gerris argentatus* (a pond skater), *Ranatra linearis* (the Water Stick Insect), *Sigara concinna* (a lesser water boatman), *Agraylea sexmaculata* (a caddis fly), *Ecnomus tenellus* (a caddis fly), and *Ilybius fenestratus* (a diving beetle).

The macroinvertebrate community of Hythe End is of very high nature conservation value.

## 6.5 EGHAM HYTHE (SITE F)

47 macroinvertebrate species were recorded, the lowest number recorded in the 1991 survey. There were 6 local species. No rare species were found.

Samples were collected from the following microhabitats:

MICROHABITAT	NUMBER OF SPECIES
<i>Phragmites australis</i>	29
<i>Typha latifolia</i> .	20
<i>Potamogeton pectinatus</i> .	19
Banking	16

The most abundant species, with over 2500 individuals recorded, was the local Zebra Mussel, *Dreissena polymorpha*. Zebra Mussels were found large numbers in every microhabitat.

Although the community was relatively species-poor, beetles were well represented for a gravel-pit lake (17 species). This was the third highest number found in any of the lakes in 1991, and equal with Wraysbury 2.

Other local species present were *Anax imperator* (the Emperor Dragonfly), *Ecnomus tenellus* (a caddis fly), *Phryganea grandis* (a caddis larva), *Haliphus confinis* (a haliplid beetle), and *Ilybius fenestratus* (a diving beetle).

The macroinvertebrate community of Egham Hythe is of high nature conservation value.

## 6.6 GREENHAM I (SITE G1)

71 macroinvertebrate species were recorded, 8 of these being local and 1 rare.

The microhabitats sampled were:

MICROHABITAT	NUMBER OF SPECIES
Herb edges	39
Emergent and floating-leaved vegetation	38
<i>Phragmites australis</i>	35
Willows	32
Inlet	26
Mud/gravel/sand	25
<i>Elodea nuttallii</i>	22
Grassy edges	21

The most abundant species in Greenham I was *Caenis horaria* (one of the mayfly family known collectively to fishermen as the Angler's Curse or white midge), with nearly 750 individuals recorded. These were mainly to be found in the *Phragmites* and the sand and gravel.

The rare caddis fly *Leptocerus lusitanicus* was present in small numbers (5 individuals only being recorded). The local species present were: *Bithynia leachi* (Leach's Bithynia), *Orchestia cavimana*, (the Bankhopper, a semi-terrestrial shrimp-like animal), *Dreissena polymorpha* (the Zebra Mussel), *Erythronia najas* (the Red-eyed Damselfly), *Micronecta scholtzi* (a lesser water boatman), *Agraylea sexmaculata* (a caddis fly), *Haliplus confinis* (a halipid water beetle), and *Ilybius fenestratus* (a diving beetle).

The macroinvertebrate population of Greenham I is of very high nature conservation value.

## 6.7 GREENHAM 2 (SITE G2)

58 macroinvertebrate species were recorded from Greenham 2, the second lowest number recorded in any of the lakes during the 1991 survey. Despite this, Greenham 2 supported 1 rare and 7 local macroinvertebrate species.

The microhabitats sampled were:

MICROHABITATS	NUMBER OF SPECIES
Willows	48
<i>Elodea nuttallii</i>	30
Sand/gravel	23
<i>Glyceria</i> sp.	23

The willows were extremely species-rich in comparison with the other microhabitats.

*Potamopyrgus jenkinsi* (Jenkins' Spire Shell) was the most abundant species present, with nearly 1500 individuals recorded. *Asellus aquaticus* (a water slater or hog louse) was also extremely abundant, with nearly 600 individuals in the sample.

The RDB2 caddis species, *Leptocerus lusitanicus*, was more abundant here than in Greenham I, with nearly 50 individuals recorded (these were mostly in the willow roots, though, as in other lakes, some were found in the *Elodea*).

The 7 local species found in Greenham 2 were: *Bithynia leachi* (Leach's Bithynia), *Dreissena polymorpha* (the Zebra Mussel), *Orchestia cavimana* (the Bankhopper), *Erythromma najas* (the Red-eyed Damselfly), *Ecnomus tenellus* (a caddis fly), *Haliplus confinis* (a haliplid water beetle), and *Ilybius fenestratus* (a diving beetle). *Orchestia cavimana* was found only in Greenham 1 and 2.

The macroinvertebrate community of Greenham 2 is of very high nature conservation value.



## 6.8 SHEPPERTON LARGE (SITE H)

83 macroinvertebrate species were recorded in Shepperton Large. 1 of these was a rare species and 12 were local.

The following microhabitats were sampled:

MICROHABITAT	NUMBER OF SPECIES
<i>Elodea nuttallii</i>	44
Herb edging	37
<i>Myriophyllum spicatum</i> .	35
<i>Phragmites australis</i>	30
Willows	29
<i>Sparganium erectum</i> .	25
<i>Nymphaea alba</i> .	20
Sand/gravel	12

The *Elodea* , with 44 species, was particularly species-rich, but all the microhabitats were moderately species-rich with the exception of the sand and gravel.

The macroinvertebrate community was dominated by two crustaceans, *Asellus aquaticus* (1150 individuals) and the freshwater shrimp *Crangonyx pseudogracilis* (nearly 1500 individuals). Two snails, *Potamopyrgus jenkinsi* (Jenkins' Spire Shell) (1150 individuals) and *Bithynia tentaculata* (nearly 600 individuals) were also very abundant.

The rare caddis fly, *Leptocerus lusitanicus*, was present in small numbers (<10 individuals) in the willows or the submerged vegetation.

12 local species were recorded which, with Wraysbury 2 (also 12 local species) was the highest number in any of the lakes. The local species recorded were: *Bithynia leachi* (Leach's Bithynia), *Gyraulus laevis* (the Smooth Ramshorn), *Dreissena polymorpha* (the Zebra Mussel), *Erythronma najas* (the Red-eyed Damselfly), *Anax imperator* (the Emperor Dragonfly), *Corixa dentipes* (a lesser water boatman), *Ranatra linearis* (the Water Stick Insect), *Agraylea sexmaculata* (a caddis larva), *Phryganea grandis* (a caddis larva), *Enochrus melanocephalus* (a hydrophilid water beetle), *Haliplus confinis* (a haliplid water beetle) and *Ilybius fenestratus* (a diving beetle).

The macroinvertebrate community of Shepperton Large is of very high nature conservation value.

## 6.9 SHEPPERTON SMALL (SITE 1)

63 macroinvertebrate species were recorded, including 4 local species (the smallest number of local species recorded during the survey) and 1 rare species. In addition the rare beetle *Oulimnius major*, was probably present (females were found, but males are required for certain identification).

The microhabitats which were sampled were:

MICROHABITATS	NUMBER OF SPECIES
Herb edges	39
<i>Elodea nuttallii</i>	36
Willows	31
Sand/gravel	30
<i>Sparganium erectum</i> .	29
<i>Mentha aquatica</i>	25
Grassy edges	23
<i>Polygonum amphibium</i> .	19

The most abundant species by far in Shepperton Small were the snail species *Potamopyrgus jenkinsi* (well over 10,000 individuals in one three minute sample), and *Bithynia tentaculata* (nearly 9,000 individuals in one sample). The local Zebra Mussel *Dreissena polymorpha* (over 1500 individuals) and the snail *Planorbis carinatus* (over 1300 individuals) were also extremely abundant. Apart from snails, which appear to be very abundant in this lake, the most abundant species were the water slater *Asellus aquaticus* (nearly 900 individuals) and the freshwater shrimp *Crangonyx pseudogracilis* (800 individuals).

The caddis fly *Leptocerus lusitanicus* was present in the *Elodea* and the willow roots.

The 4 local species present were *Bithynia leachi* (Leach's Bithynia), *Dreissena polymorpha* (the Zebra Mussel), *Gerris argentatus* (a pond skater) and *Ranatra linearis* (the Water Stick Insect).

The macroinvertebrate community of Shepperton Small is of very high nature conservation value.

#### 6.10 FERRY LANE (SITE J)

66 macroinvertebrate species were recorded in Ferry Lane, of which 8 were local. There were no rare species.

The microhabitats sampled were:

MICROHABITAT	NUMBER OF SPECIES
<i>Nuphar lutea</i>	43
<i>Mentha aquatica</i>	41
Willow	40
<i>Typha</i> spp.	34
Grassy edges	31
Herb edges	27
Sand/gravel	24
<i>Elodea nuttallii</i>	20

The most abundant species in Ferry Lane was the freshwater shrimp *Crangonyx pseudogracilis*, with over 2600 individuals present in the sample. Also very abundant were the water slater *Asellus aquaticus* (over 1300 individuals) and the snails *Potamopyrgus jenkinsi* (over 1800) and *Bithynia tentaculata* (nearly 1200).

There were no rare species, but the 8 local species were *Gyraulus laevis* (the Smooth Ramshorn), *Dreissena polymorpha* (the Zebra Mussel), *Erythromma najas* (the Red-eyed Damselfly), *Corixa panzeri* (a lesser water boatman), *Ranatra linearis* (the Water Stick Insect), *Haliphus confinis* (a haliplid water beetle), *Hygrobia hermanni* (the Screech Beetle) and *Ilybius fenestratus* (a diving beetle).

The macroinvertebrate community of Ferry Lane is of high nature conservation value.

## 6.11 WRAYSBURY 2 (SITE W)

Wraysbury 2 Lake was last surveyed in 1989. (See DWSC Flood Study, Pond Action 1990 for species lists etc.).

In 1991, 103 macroinvertebrate species were recorded in Wraysbury 2, the largest number recorded in any of the lakes. Of these, 2 were rare and 12 local. With the exception of Shepperton Large, which also had 12 local species, this was also the largest number of local species found in any of the lakes.

The microhabitats sampled for macroinvertebrates were:

MICROHABITAT	NUMBER OF SPECIES
<i>Sparganium erectum</i> .	58
Willows	56
<i>Phragmites australis</i>	50
Inlets	50
Grassy edges	49
Sand/gravel	47
Herb edges	44
<i>Elodea nuttallii</i>	40

All the microhabitats were extremely species-rich, none of them yielding less than 40 species.

The dominant species numerically was *Dreissena polymorpha*, the local Zebra Mussel (nearly 3500 individuals). The snail *Potamopyrgus jenkinsi* (Jenkins' Spire Shell) (nearly 3000 individuals), the water slater *Asellus aquaticus* (2700 individuals) and the freshwater shrimp *Crangonyx pseudogracilis* (1500 individuals) were also very abundant.

Wraysbury 2 supported 2 rare species, the caddis fly *Leptocerus lusitanicus* (found in 1989, but in smaller numbers) and the riffle beetle *Oulimnius major* (also found in 1989).

Besides *Dreissena polymorpha*, 11 local species were found. These were *Bithynia leachi* (Leach's Bithynia), *Gyraulus laevis* (the Smooth Ramshorn), *Unio tumidus* (a freshwater mussel), *Erythromma najas* (the red-eyed Damselfly), *Anax imperator* (the Emperor Dragonfly), *Corixa panzeri* (a lesser water boatman), *Ranatra linearis* (the Water Stick Insect), *Agraylea sexmaculata*, *Ecnomus tenellus* and *Phryganea grandis* (caddis flies), and *Haliphus confinis* (a halipid water beetle).

The macroinvertebrate community of Wraysbury 2 is of very high nature conservation value.

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**APPENDIX 1. WETLAND PLANTS RECORDED IN TEN LAKES IN THE DATCHET-CHERTSEY COMPLEX IN AUTUMN 1991.**

A	Leisure Sport 3	G1	Greenham 1
B	Leisure Sport 2	G2	Greenham 2
C	Longfield Farm	H	Shepperton Large
E	Hythe End	I	Shepperton Small
F	Egham Hythe	J	Ferry Lane

\* = plants were not identified to species level because flowering or fruiting material necessary for reliable identification was not available.

SPECIES	A	B	C	E	F	G1	G2	H	I	J
<i>Azolla filiculoides</i>	-	-	-	-	-	+	-	-	-	+
<i>Agrostis stolonifera</i>	+	+	+	+	+	+	+	+	+	+
<i>Alisma plantago-aquatica</i>	+	+	+	+	+	+	+	+	+	+
<i>Alopecurus geniculatus</i>	-	-	-	-	-	+	-	-	-	+
<i>Angelica sylvestris</i>	-	-	-	-	+	-	-	+	+	-
<i>Bidens cernua</i>	-	-	+	-	-	-	-	-	-	-
<i>Bidens tripartita</i>	-	-	-	-	-	+	+	-	-	+
<i>Butomus umbellatus</i>	-	-	-	-	-	+	-	-	-	-
<i>Callitriche</i> sp*.	-	-	-	-	-	-	-	-	-	+
<i>Carex acutiformis</i>	+	-	-	-	-	-	-	-	-	-
<i>Carex otrubae</i>	-	+	+	+	+	+	+	+	+	-
<i>Carex pendula</i>	-	-	-	+	-	-	+	-	-	-
<i>Carex pseudocyperus</i>	+	-	+	+	-	+	+	-	-	-
<i>Carex riparia</i>	+	+	-	-	+	-	+	+	+	-
<i>Ceratophyllum demersum</i>	-	+	+	-	-	-	-	+	-	-
<i>Chara vulgaris</i>	-	+	-	-	-	-	-	-	+	-
<i>Chara vulgaris</i> var.longibract.	+	-	-	-	-	-	-	-	-	-
<i>Deschampsia caespitosa</i>	-	-	-	+	+	-	-	+	+	-
<i>Eleocharis palustris</i>	-	-	+	-	-	-	-	-	-	+
<i>Elodea nuttallii</i>	+	+	+	-	+	+	+	+	+	+
<i>Epilobium hirsutum</i>	+	+	+	+	+	+	+	+	+	+
<i>Equisetum palustre</i>	-	-	+	+	-	+	-	-	-	+
<i>Eupatorium cannabinum</i>	-	-	-	+	-	+	+	+	-	-
<i>Filipendula ulmaria</i>	-	-	-	-	+	-	-	-	-	-
<i>Fontinalis antipyretica</i>	-	+	-	-	-	-	-	-	-	-
<i>Galium palustre</i>	+	-	-	-	-	-	-	-	-	-
<i>Glyceria fluitans</i>	-	-	+	-	-	-	-	-	-	-
<i>Glyceria maxima</i>	+	-	-	-	-	+	+	+	+	-
<i>Hippuris vulgaris</i>	-	-	-	+	-	-	-	-	-	-
<i>Hottonia palustris</i>	+	-	-	-	-	-	-	-	-	-
<i>Impatiens glandulifera</i>	-	-	-	-	-	-	-	-	-	+
<i>Iris pseudacorus</i>	+	+	+	-	+	+	-	+	-	+
<i>Juncus articulatus</i>	-	-	-	+	+	+	+	+	+	+
<i>Juncus bufonius</i>	-	+	+	-	+	+	+	-	+	+
<i>Juncus compressus</i>	-	-	-	-	-	-	-	-	-	+
<i>Juncus conglomeratus</i>	-	-	-	-	-	-	+	-	-	-
<i>Juncus effusus</i>	-	-	+	+	+	+	+	+	+	+
<i>Juncus inflexus</i>	+	+	+	+	+	+	+	+	+	+

**APPENDIX 1. WETLAND PLANTS RECORDED IN TEN LAKES IN THE DATCHET-CHERTSEY COMPLEX IN AUTUMN 1991**  
(cont.)

<b>SPECIES</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>E</b>	<b>F</b>	<b>G1</b>	<b>G2</b>	<b>H</b>	<b>I</b>	<b>J</b>
Lemna minor	-	-	+	-	-	+	-	+	+	+
Lemna minuscula	-	-	+	-	-	-	-	-	-	+
Lemna polyrhiza	-	-	-	-	-	-	-	-	-	+
Lemna trisulca	+	-	+	-	-	-	-	-	-	-
Lycopus europaeus	+	+	+	+	+	+	+	+	+	+
Lysimachia vulgaris	-	-	-	-	-	+	-	-	-	-
Lythrum salicaria	+	-	+	+	+	+	+	+	+	+
Mentha aquatica	+	+	-	-	-	+	+	+	+	+
Myosotis scorpioides	+	-	+	-	-	-	-	-	-	+
Myosoton aquaticum	-	-	-	-	-	-	-	-	-	+
Myriophyllum spicatum	-	-	-	+	-	+	+	+	-	-
Nasturtium officinale/ microphyllum*	-	-	-	+	-	+	-	+	-	-
Nymphaea alba	+	-	-	+	-	+	-	-	-	+
Nuphar lutea	+	-	-	+	-	+	-	-	-	-
Phalaris arundinacea	-	-	-	-	+	-	-	-	-	+
Phragmites australis	-	-	-	+	+	+	-	+	+	-
Polygonum amphibium	+	-	+	-	+	+	+	+	+	+
Polygonum hydropiper	+	-	-	-	-	-	-	-	-	-
Polygonum lapathifolium	-	-	-	-	-	-	+	-	-	-
Polygonum persicaria	+	-	-	+	-	+	+	+	+	+
Potamogeton berchtoldii	-	-	-	+	-	-	-	-	+	+
Potamogeton crispus	+	-	-	-	-	-	-	-	+	-
Potamogeton pectinatus	+	-	+	+	+	+	+	+	+	-
Potamogeton pusillus	-	-	-	-	-	+	-	-	-	-
Ranunculus lingua	+	-	-	-	-	-	-	-	-	-
Ranunculus sceleratus	-	-	-	+	-	+	+	+	-	+
Ranunculus sp. (probably peltatus)*	+	-	-	-	-	-	-	-	+	-
Rorippa amphibia	-	-	-	-	-	+	+	-	-	+
Rorippa palustris	-	-	-	-	-	+	-	-	-	+
Rorippa sylvestris	-	-	-	-	-	-	-	-	-	+
Rumex palustris	-	-	-	-	-	+	-	-	-	+
Scrophularia auriculata	+	-	-	-	+	-	+	+	+	+
Scutellaria galericulata	-	-	+	-	-	-	-	+	+	-
Solanum dulcamara	+	-	+	+	+	+	+	+	+	+
Sparganium emersum	+	-	-	-	-	-	-	-	-	-
Sparganium erectum	+	+	+	+	-	-	-	+	+	-
Stachys palustris	+	-	+	-	-	-	+	+	-	+
Symphytum officinale	-	-	-	+	+	+	-	+	-	-
Typha angustifolia	+	-	-	-	+	+	+	-	-	-
Typha latifolia	+	+	+	+	+	+	-	+	+	+
Urtica dioica	+	-	-	-	+	+	+	+	+	+
Utricularia vulgaris	+	+	+	+	-	-	-	-	-	-
Veronica anagallis-aquatica/ catenata*	-	-	-	+	-	-	-	-	-	+
Zannichellia palustris	-	-	-	-	-	-	-	-	+	-
<b>TOTAL</b>	<b>3 6</b>	<b>1 7</b>	<b>3 0</b>	<b>3 0</b>	<b>2 6</b>	<b>4 1</b>	<b>3 1</b>	<b>3 4</b>	<b>3 2</b>	<b>4 1</b>

## **APPENDIX 2. STATUS IN BRITAIN OF RARE AND LOCAL PLANTS RECORDED IN THE GRAVEL PIT LAKES OF THE DATCHET-CHERTSEY COMPLEX**

Status and distributions from Clapham, Tutin and Moore (1988) and Palmer and Newbold (1983) except for *Zannichellia* (from Clapham, Tutin and Warburg, 1962).

### **SUBMERGED AND FLOATING-LEAVED SPECIES**

#### **LOCAL**

##### ***Ceratophyllum demersum***

A local plant of ponds and ditches. Scattered throughout England.

##### ***Hippuris vulgaris***

A local plant of ponds, lakes and slow streams. Scattered throughout England.

##### ***Hottonia palustris***

A local plant except in the east. Native in ponds and ditches. Listed by Palmer and Newbold (1983) as an aquatic plant recorded in from more than 100 10 x 10km squares in Great Britain but which need special protection in the Thames catchment.

##### ***Lemna polyrhiza***

Local. Native in still waters in ditches and ponds.

##### ***Myriophyllum spicatum***

A locally common plant of lakes, ponds and ditches, especially in base rich water.

##### ***Utricularia vulgaris***

Local, but rare in the west. In lakes, ponds and ditches in base rich water.

##### ***Zannichellia palustris***

A local plant of slow flowing rivers, ponds and lakes. Scattered throughout England.

### **EMERGENT AND MARGINAL SPECIES**

#### **RARE**

##### ***Juncus compressus***

A rather rare plant, mainly found in south eastern England. Found in marshes, alluvial meadows and grassy places where vegetation is kept low by mowing or grazing. Usually on non-acidic soils.

##### ***Rumex palustris***

Listed by Palmer and Newbold (1983) as an aquatic plant recorded from less than 100 10 x 10km squares in Great Britain, and which needs special protection in the Thames catchment. Described in Clapham et al.(1988) only as a only local plant, found on bare muddy ground by lakes and reservoirs and in dried up ponds.



**APPENDIX 2. STATUS IN BRITAIN OF RARE AND LOCAL PLANTS RECORDED IN**  
**(cont.) THE GRAVEL PIT LAKES OF THE DATCHET-CHERTSEY COMPLEX**

**LOCAL**

**Bidens cernua**

A locally common plant of ponds and streamsides and especially places with seasonal standing water. Scattered throughout the British Isles.

**Bidens tripartita**

A locally common plant of ditches, pond and lake margins and streamsides. Scattered throughout the British Isles.

**Butomus umbellatus**

A rather local plant of ditches, ponds, canals and river margins. Scattered throughout England and rarer elsewhere.

**Lysimachia vulgaris**

Locally common in fens and beside rivers and lakes. Scattered throughout the British Isles.

**Ranunculus lingua**

A local plant of the reedswamp zone of marshes and 'mixed fens' bordering streams and ponds where some silt is deposited; now decreasing through drainage. Listed by Palmer and Newbold (1983) in Table 2 as a wetland plant recorded in from more than 100 10 x 10km squares in Great Britain but which need special protection in the Thames catchment.

**Rorippa amphibia**

Locally frequent by ponds ditches and streams. Recorded from south-east to north England.

**Typha angustifolia**

A locally common plant of reed-swamps, ponds, canals and slow flowing rivers. Scattered throughout the British Isles.

**APPENDIX 3      COMMON NAMES OF WETLAND SPECIES RECORDED FROM GRAVEL PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX**

<b>SPECIES NAME</b>	<b>COMMON NAME</b>
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Alisma plantago-aquatica</i>	Water-plantain
<i>Alopecurus geniculatus</i>	Marsh Foxtail
<i>Angelica sylvestris</i>	Wild Angelica
<i>Azolla filiculoides</i>	Water Fern
<i>Bidens cernua</i>	Nodding Bur-marigold
<i>Bidens tripartita</i>	Trifid Bur-marigold
<i>Butomus umbellatus</i>	Flowering-rush
<i>Callitriche</i> sp.	Starwort
<i>Carex acutiformis</i>	Lesser Pond-sedge
<i>Carex otrubae</i>	False Fox-sedge
<i>Carex pendula</i>	Pendulous Sedge
<i>Carex pseudocyperus</i>	Cyperus Sedge
<i>Carex riparia</i>	Greater Pond-sedge
<i>Ceratophyllum demersum</i>	Rigid Hornwort
<i>Chara vulgaris</i>	Common Stonewort
<i>Deschampsia caespitosa</i>	Tufted Hair-grass
<i>Eleocharis palustris</i>	Common Spike-rush
<i>Elodea nuttallii</i>	Nuttall's Waterweed
<i>Epilobium hirsutum</i>	Great Willowherb
<i>Equisetum palustre</i>	Marsh Horsetail
<i>Eupatorium cannabinum</i>	Hemp-agrimony
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Fontinalis antipyretica</i>	Willow Moss
<i>Galium palustre</i>	Common Marsh-bedstraw
<i>Glyceria fluitans</i>	Floating Sweet-grass
<i>Glyceria maxima</i>	Reed Sweet-grass
<i>Hippuris vulgaris</i>	Mare's-tail
<i>Hottonia palustris</i>	Water-violet
<i>Impatiens glandulifera</i>	Indian Balsam
<i>Iris pseudacorus</i>	Yellow Flag
<i>Juncus articulatus</i>	Jointed Rush
<i>Juncus bufonius</i>	Toad Rush
<i>Juncus compressus</i>	Round-fruited Rush
<i>Juncus conglomeratus</i>	Compact Rush
<i>Juncus effusus</i>	Soft Rush
<i>Juncus inflexus</i>	Hard Rush
<i>Lemna minor</i>	Common Duckweed
<i>Lemna minuscule</i>	Least Duckweed
<i>Lemna polyrhiza</i>	Greater duckweed
<i>Lemna trisulca</i>	Ivy-leaved Duckweed
<i>Lycopus europaeus</i>	Gipsywort
<i>Lysimachia vulgaris</i>	Yellow Loosestrife
<i>Lythrum salicaria</i>	Purple-loosestrife
<i>Mentha aquatica</i>	Water Mint
<i>Myosotis scorpioides</i>	Water Forget-me-not
<i>Myosoton aquaticum</i>	Water Chickweed
<i>Myriophyllum spicatum</i>	Spiked Water-milfoil
<i>Nasturtium officinale/microphyllum</i>	Water-cress

**APPENDIX 3      COMMON NAMES OF WETLAND SPECIES RECORDED FROM**  
**(cont.)           GRAVEL PIT LAKES IN THE DATCHET-CHERTSEY COMPLEX**

<b>SPECIES NAME</b>	<b>COMMON NAME</b>
<i>Nymphaea alba</i>	White Water-lily
<i>Nuphar lutea</i>	Yellow Water-lily
<i>Phalaris arundinacea</i>	Reed Canary-grass
<i>Phragmites australis</i>	Common Reed
<i>Polygonum amphibium</i>	Amphibious Bistort
<i>Polygonum hydropiper</i>	Water-pepper
<i>Polygonum lapathifolium</i>	Pale Persicaria
<i>Polygonum persicaria</i>	Redshank
<i>Potamogeton berchtoldii</i>	Small Pondweed
<i>Potamogeton crispus</i>	Curled Pondweed
<i>Potamogeton pectinatus</i>	Fennel Pondweed
<i>Potamogeton pusillus</i>	Lesser Pondweed
<i>Ranunculus lingua</i>	Greater Spearwort
<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup
<i>Ranunculus</i> sp.	Water-crowfoot
<i>Rorippa amphibia</i>	Great Yellow-cress
<i>Rorippa palustris</i>	Marsh Yellow-cress
<i>Rorippa sylvestris</i>	Creeping Yellow-cress
<i>Rumex palustris</i>	Marsh Dock
<i>Scrophularia auriculata</i>	Water Figwort
<i>Scutellaria galericulata</i>	Skullcap
<i>Solanum dulcamara</i>	Bittersweet
<i>Sparganium emersum</i>	Unbranched Bur-reed
<i>Sparganium erectum</i>	Branched Bur-reed
<i>Stachys palustris</i>	Marsh Woundwort
<i>Symphytum officinale</i>	Common Comfrey
<i>Typha angustifolia</i>	Lesser Bulrush
<i>Typha latifolia</i>	Bulrush
<i>Urtica dioica</i>	Common Nettle
<i>Veronica anagallis-aquatica/catenata</i>	Blue/Pink Water-speedwell
<i>Veronica beccabunga</i>	Brooklime
<i>Zannichellia palustris</i>	Horned Pondweed

Latin and English equivalents from Dony et.al. (1986)

**APPENDIX 4. AQUATIC MACROINVERTEBRATES RECORDED IN ELEVEN LAKES IN THE DATCHET-CHERTSEY COMPLEX IN AUTUMN 1991.**

<b>A</b>	<b>Leisure Sport 1</b>	<b>G2</b>	<b>Greenham 2</b>
<b>B</b>	<b>Leisure Sport 2</b>	<b>H</b>	<b>Shepperton Large</b>
<b>C</b>	<b>Longfield Farm</b>	<b>I</b>	<b>Shepperton Small</b>
<b>E</b>	<b>Hythe End</b>	<b>J</b>	<b>Ferry Lane</b>
<b>F</b>	<b>Egham Hythe</b>	<b>W</b>	<b>Wraysbury</b>
<b>G1</b>	<b>Greenham 1</b>		

	<b>A</b>	<b>B</b>	<b>C</b>	<b>E</b>	<b>F</b>	<b>G1</b>	<b>G2</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>W</b>
<b>TRICLADIDA (FLATWORMS)</b>											
Dendrocoelum lacteum	+	-	-	+	+	+	-	-	+	-	-
Dugesia polychroa	-	+	-	-	-	-	-	-	-	+	+
Dugesia tigrina	+	+	+	+	+	+	+	+	+	+	+
Polycelis tenuis	-	-	-	-	-	-	-	+	-	-	-
<b>HIRUDINEA (LEECHES)</b>											
Erpobdella octoculata	-	-	+	+	-	+	+	-	-	-	+
Glossiphonia complanata	-	-	+	-	-	-	-	-	+	-	+
Glossiphonia heteroclita	-	-	-	-	-	-	-	+	+	+	+
Haemopsis sanguisuga	-	-	-	-	-	+	-	-	-	-	-
Helobdella stagnalis	-	+	-	+	-	+	-	+	-	+	+
Hemiclepsis marginata	-	-	+	+	-	-	-	-	-	+	+
Piscicola geometra	+	-	-	-	+	-	-	-	-	-	+
Theromyzon tessellatum	-	+	+	-	-	-	-	+	+	+	+
<b>CRUSTACEA (SHRIMPS, SLATERS AND FISH-LICE)</b>											
Argulus foliaceus	-	-	-	-	-	-	-	-	-	+	-
Asellus aquaticus	+	+	+	+	+	+	+	+	+	+	+
Asellus meridianus	-	-	+	+	-	-	-	+	-	+	+
Crangonyx pseudogracilis	+	+	+	+	+	+	+	+	+	+	+
Gammarus pulex	-	-	+	+	-	-	-	+	+	+	+
Orchestia cavimana	-	-	-	-	-	+	+	-	-	-	-
<b>BIVALVIA (FRESHWATER MUSSELS)</b>											
Anodonta anatina	-	-	-	-	-	-	-	-	-	-	+
Anodonta cygnea	-	-	-	-	-	+	-	-	-	-	+
Dreissena polymorpha	-	+	+	-	+	+	+	+	+	+	+
Sphaerium corneum	+	-	+	-	-	+	+	-	-	+	+
Sphaerium lacustre	+	-	-	-	-	-	-	-	-	+	-
Unio pictorum	-	-	-	-	-	+	-	-	-	-	-
Unio tumidus	-	-	-	-	-	-	-	-	-	-	+

	A	B	C	E	F	G1	G2	H	I	J	W
<b>GASTROPODA (WATER SNAILS)</b>											
<i>Acroloxus lacustris</i>	+	-	+	-	+	+	-	+	+	-	+
<i>Anisus leucostoma</i>	-	-	-	-	-	-	-	-	-	+	+
<i>Anisus vortex</i>	+	+	+	-	+	-	-	+	+	+	+
<i>Armiger crista</i>	+	-	+	-	-	-	+	+	+	+	+
<i>Bathyomphalus contortus</i>	+	-	+	-	-	-	+	-	+	-	+
<i>Bithynia leachi</i>	+	-	+	+	-	+	+	+	+	-	+
<i>Bithynia tentaculata</i>	+	+	+	+	+	+	+	+	+	+	+
<i>Ferrisia wautieri</i>	-	-	-	+	-	-	-	+	-	-	-
<i>Gyraulus albus</i>	+	+	+	-	+	+	+	+	+	+	+
<i>Gyraulus laevis</i>	+	+	-	-	-	-	-	+	-	+	+
<i>Hippeutis complanatus</i>	+	+	+	+	+	+	+	+	+	+	+
<i>Lymnaea auricularia</i>	+	+	-	+	-	+	+	+	-	-	+
<i>Lymnaea palustris</i>	+	+	-	+	-	-	+	+	+	+	+
<i>Lymnaea peregra</i>	+	-	-	+	-	+	+	-	+	+	+
<i>Lymnaea stagnalis</i>	-	+	+	-	+	+	+	+	+	+	+
<i>Lymnaea truncatula</i>	-	+	-	-	+	+	-	-	-	-	+
<i>Lithoglyphus naticoides</i>	-	-	(+)	(+)	-	-	-	-	-	-	-
<i>Physa acuta</i> (type)	+	+	+	+	+	+	+	+	+	+	+
<i>Physa fontinalis</i>	-	-	-	-	-	-	-	-	-	-	+
<i>Planorbarius corneus</i>	-	-	-	-	-	-	-	+	-	+	+
<i>Planorbis carinatus</i>	+	+	+	+	-	+	+	+	+	+	+
<i>Potamopyrgus jenkinsi</i>	+	+	+	+	+	+	+	+	+	+	+
<i>Theodoxus fluviatilis</i>	-	-	-	-	-	+	+	-	-	+	-
<i>Valvata cristata</i>	-	-	+	-	-	-	-	-	-	-	-
<i>Valvata piscinalis</i>	+	+	+	+	-	+	+	+	+	+	+
<b>EPHEMEROPTERA (MAYFLIES)</b>											
<i>Caenis horaria</i>	+	+	+	+	+	+	+	+	+	+	+
<i>Caenis luctuosa</i>	+	+	+	-	-	+	+	-	+	+	+
<i>Caenis robusta</i>	-	-	-	-	+	+	-	+	-	-	+
<i>Cloeon dipterum</i>	+	+	+	+	-	-	+	+	+	+	+
<i>Ephemera vulgata</i>	-	+	-	-	-	+	-	-	+	-	+
<b>ODONATA (DRAGONFLIES AND DAMSELFLIES)</b>											
<i>Aeshna cyanea</i>	-	-	-	-	-	-	-	+	+	-	-
<i>Aeshna grandis</i>	+	+	+	+	-	-	-	-	-	-	-
<i>Anax imperator</i>	-	-	+	+	+	-	-	+	-	-	+
<i>Calopteryx splendens</i>	-	-	-	-	-	-	-	-	-	-	+
<i>Coenagrion puella/pulchellum</i>	+	-	+	-	-	-	-	-	-	-	-
<i>Enallagma cyathigerum</i>	+	-	+	+	-	+	+	+	+	+	+
<i>Erythromma najas</i>	+	-	+	+	-	+	+	+	-	+	+
<i>Ischnura elegans</i>	+	+	+	+	+	+	+	+	+	+	+
<i>Libellula depressa</i>	-	-	+	+	-	+	-	-	-	-	-
<i>Libellula quadrimaculata</i>	-	-	-	-	-	+	-	-	-	-	-
<b>ARACHNIDA (SPIDERS)</b>											
<i>Argyroneta aquatica</i>	+	-	-	-	-	-	-	-	-	-	-
<b>MEGALOPTERA (ALDERFLIES)</b>											
<i>Sialis lutaria</i>	+	+	+	+	-	+	+	+	+	+	+

	A	B	C	E	F	G1	G2	H	I	J	W
<b>HETEROPTERA (WATER BUGS)</b>											
<i>Corixa dentipes</i>	-	-	-	-	-	-	-	+	-	-	-
<i>Corixa panzeri</i>	-	-	-	-	-	-	-	-	-	+	+
<i>Corixa punctata</i>	-	-	-	-	-	-	-	-	-	-	+
<i>Cymatia coleoptrata</i>	-	-	+	-	-	-	-	+	-	-	+
<i>Gerris argentatus</i>	-	-	+	+	-	-	-	-	+	-	-
<i>Gerris lacustris</i>	-	+	-	-	-	+	-	+	+	-	+
<i>Hesperocorixa sahlbergi</i>	-	-	+	-	-	-	-	-	-	-	-
<i>Hydrometra stagnorum</i>	+	+	+	+	-	-	-	+	+	-	+
<i>Ilyocoris cimicoides</i>	-	+	+	+	-	-	-	+	-	+	+
<i>Micronecta poweri</i>	-	-	-	-	+	-	-	-	-	-	-
<i>Micronecta scholtzi</i>	-	-	-	-	-	+	-	-	-	-	-
<i>Microvelia reticulata</i>	+	-	+	+	+	-	-	+	-	-	-
<i>Nepa cinerea</i>	-	-	+	-	-	+	+	+	-	-	+
<i>Notonecta glauca</i>	+	-	+	+	-	-	-	+	+	+	+
<i>Notonecta maculata</i>	-	-	+	-	-	-	-	-	+	-	-
<i>Notonecta marmorea viridis</i>	+	+	+	+	+	-	-	+	-	+	+
<i>Plealeachi</i>	-	+	-	-	-	-	-	+	+	-	-
<i>Ranatra linearis</i>	-	-	+	+	-	-	-	+	-	+	+
<i>Sigara concinna</i>	-	+	+	+	-	-	-	-	-	-	-
<i>Sigara distincta</i>	-	+	-	-	-	-	-	+	-	+	-
<i>Sigara dorsalis</i>	+	-	+	+	+	+	+	-	+	+	+
<i>Sigara falleni</i>	-	-	-	+	+	+	-	+	+	+	+
<i>Sigara fossarum</i>	-	+	-	-	-	-	-	-	-	-	+
<i>Sigara lateralis</i>	+	-	-	-	-	-	-	-	-	-	-

#### TRICHOPTERA (CADDIS FLIES)

<i>Agraylea multipunctata</i>	+	+	+	+	+	+	+	+	+	+	+
<i>Agraylea sexmaculata</i>	-	-	+	+	-	+	-	+	-	-	+
<i>Agrypnia varia</i>	+	-	-	+	-	-	-	-	-	-	-
<i>Anabolia nervosa</i>	-	-	-	-	-	-	-	-	+	-	+
<i>Athripsodes aterrimus</i>	+	+	+	+	+	+	+	+	-	+	+
<i>Athripsodes cinereus</i>	+	+	+	+	-	+	+	+	+	+	+
<i>Cyrnus flavidus</i>	+	+	+	-	+	+	+	+	-	-	+
<i>Cyrnus trimaculatus</i>	-	-	-	+	-	-	+	-	-	-	+
<i>Ecnomus tenellus</i>	-	-	-	+	+	-	+	-	-	-	+
<i>Holocentropus dubius</i>	-	-	-	-	-	-	+	-	-	-	+
<i>Holocentropus picicornis</i>	-	-	-	-	-	-	-	-	-	-	+
<i>Hydropsyche augustipennis</i>	-	-	-	-	-	-	-	-	-	-	+
<i>Hydropsyche pellucidula</i>	-	-	-	-	-	-	-	-	-	-	+
<i>Leptocerus lusitanicus</i>	+	+	+	+	-	+	+	+	+	-	+
<i>Leptocerus tineiformis</i>	+	+	+	+	-	-	+	+	+	-	-
<i>Lype reducta</i>	+	-	-	+	-	-	-	-	-	-	+
<i>Molanna angustata</i>	-	-	+	-	-	+	+	+	-	+	+
<i>Mystacides azurea</i>	-	-	+	+	-	+	+	-	+	+	+
<i>Mystacides longicornis</i>	+	+	+	+	-	+	+	+	+	+	+
<i>Oecetis lacustris</i>	-	-	-	-	-	+	-	-	-	+	-
<i>Oecetis ochracea</i>	-	-	-	-	-	+	-	-	-	+	-
<i>Oecetis testacea</i>	+	-	-	-	-	-	-	-	-	-	-
<i>Phryganea bipunctata</i>	-	+	-	+	-	-	-	+	-	-	+
<i>Phryganea grandis</i>	+	-	-	-	+	-	-	+	-	-	+
<i>Rhyacophila dorsalis</i>	-	-	-	-	-	-	-	-	-	-	+
<i>Tinodes waeneri</i>	+	+	+	+	-	+	-	+	+	-	+
<i>Trienodes bicolor</i>	+	+	+	+	+	-	-	+	-	-	-

	A	B	C	E	F	G1	G2	H	I	J	W
<b>LEPIDOPTERA (MOTHS AND BUTTERFLIES)</b>											
<i>Paraponyx stratiotata</i>	+	+	+	+	-	-	-	+	+	-	+
<b>COLEOPTERA (WATER BEETLES)</b>											
<i>Anacaena bipustulata</i>	+	+	+	+	+	+	+	+	+	-	+
<i>Anacaena globulus</i>	-	-	+	-	+	-	-	-	-	-	-
<i>Anacaena limbata</i>	+	+	-	-	+	+	+	-	-	-	+
<i>Anacaena lutescens</i>	-	-	-	-	-	-	+	-	-	-	-
<i>Dryops luridus</i>	-	+	-	+	-	+	+	+	+	-	-
<i>Elmis aenea</i>	-	-	-	-	-	-	-	-	-	-	+
<i>Enochrus melanocephalus</i>	-	-	-	-	-	-	-	+	-	-	-
<i>Enochrus ochropterus</i>	-	-	-	-	-	+	-	+	-	-	-
<i>Enochrus testaceus</i>	-	-	-	-	+	-	-	-	-	-	-
<i>Gyrinus marinus</i>	-	-	+	-	-	-	-	+	-	-	-
<i>Gyrinus substriatus</i>	-	+	-	-	-	-	-	-	-	-	+
<i>Haliplus confinis</i>	-	+	-	-	+	+	+	+	-	+	+
<i>Haliplus flavicollis</i>	+	+	+	-	+	+	+	+	+	+	+
<i>Haliplus fluviatilis</i>	-	-	-	-	+	+	+	+	+	+	+
<i>Haliplus immaculatus</i>	+	+	+	+	+	+	+	+	+	+	+
<i>Haliplus lineatocollis</i>	-	-	+	-	-	+	-	+	-	-	+
<i>Haliplus lineolatus</i>	+	+	+	+	+	-	+	+	+	+	+
<i>Haliplus obliquus</i>	-	-	+	-	-	-	-	-	-	-	-
<i>Haliplus ruficollis</i>	+	-	+	+	-	+	-	-	+	+	+
<i>Helochares lividus</i>	-	-	-	-	-	+	+	+	-	+	-
<i>Helophorus brevipalpis</i>	-	-	-	-	-	-	+	-	-	-	-
<i>Helophorus minutus</i>	-	-	-	+	-	-	-	-	-	-	-
<i>Heterocerus fenestratus</i>	-	-	-	-	-	+	-	-	-	-	-
<i>Hydrobius fuscipes</i>	-	-	-	-	-	+	-	-	-	-	-
<i>Hydroporus palustris</i>	-	+	-	-	-	-	-	-	-	-	-
<i>Hygrobia hermanni</i>	-	-	-	-	-	-	-	-	-	+	-
<i>Hygrotus versicolor</i>	-	-	+	-	-	-	-	-	-	-	-
<i>Hyphydrus ovatus</i>	+	+	+	+	+	-	+	+	+	+	+
<i>Ilybius fenestratus</i>	+	+	-	+	+	+	+	+	-	+	-
<i>Ilybius fuliginosus</i>	-	-	-	+	+	-	-	-	-	-	-
<i>Laccobius bipunctatus</i>	-	-	-	-	-	-	-	+	-	-	-
<i>Laccobius minutus</i>	-	-	+	-	+	+	+	+	+	+	-
<i>Laccobius striatulus</i>	-	+	-	-	-	+	-	+	+	-	-
<i>Laccophilus hyalinus</i>	-	+	-	-	+	-	-	+	+	+	+
<i>Limnebius nitidus</i>	-	-	+	-	-	-	-	-	-	-	-
<i>Noterus clavicornis</i>	-	-	-	-	+	+	-	+	-	+	-
<i>Ochthebius minimus</i>	-	-	-	-	+	-	-	-	-	-	-
<i>Oulimnius major</i>	-	-	+	-	-	-	-	-	-	-	+
<i>Oulimnius tuberculatus</i>	-	+	-	-	+	-	-	-	+	-	+
<i>Potamonectes depressus elegans</i>	-	-	-	-	-	+	-	+	+	-	-
<i>Stictotarsus duodecimpustulatus</i>	-	-	-	-	-	-	-	-	+	-	+

## **APPENDIX 5     STATUS IN BRITAIN OF RARE AND LOCAL AQUATIC MACROINVERTEBRATES RECORDED IN GRAVEL PIT LAKES OF THE DATCHET-CHERTSEY COMPLEX**

### **RARE SPECIES**

***Lithoglyphus natlicoides* (GASTROPODA: Hydrobiidae). An operculate water snail.**

This snail (at present only tentatively identified and awaiting confirmation) has not previously been recorded in Great Britain. It originated in the Black Sea area and is known to have spread secondarily to western Europe. Its preferred habitat in Poland has been described as stones or mud near the banks of slow-flowing waters.

***Leptocerus lusitanicus* (TRICHOPTERA: Leptoceridae). A caddis fly.**

**RDB2.** *Leptocerus lusitanicus*, was described in our last report as in danger of extinction in Britain (RDB1). Since that time, and in part due to the finding of this species in Wraysbury 2 during the 1989 survey, it has been "downgraded" to RDB2 (Vulnerable). During the 1991 study this caddis fly has now been found to be apparently well established in 9 of the 11 lakes surveyed (it was not found in Sites F or J.) It was, indeed, numerically by far the most abundant species in Site C! On the basis of present information, however, it is limited to the R.Thames, and lakes in the Thames floodplain, and to the R.Thames and it is still considered rare within this range.

*Leptocerus lusitanicus* generally prefers fine tangles of submerged tree roots, but has now been found in a variety of other habitats (notably *Eloдея*). (I.D. Wallace, 1991 and pers. comm.; Pond Action, unpublished data.)

***Oullmnus major* (COLEOPTERA: Elmidae). A riffle beetle.**

**RDB3.** An Elmid beetle with an Atlantic distribution from Portugal to Southern England. Previous British sites are the River Teme (Worcestershire) and fen/clay pits in Lincolnshire, Cambridgeshire and Suffolk (D.Bilton pers. comm.). This beetle was recorded in Wraysbury II in 1989; during this survey it was again found here, and in addition was recorded in Pit C (Longfield Farm). Its Red Data Book designation denotes that it is at present considered Rare.

### **LOCAL SPECIES**

***Bithynia leachi* (GASTROPODA: Hydrobiidae). Leach's Bithynia.**

This snail is confined to south-east England, where it is locally common in large ponds and slow-flowing rivers. (J.Bratton, pers. comm.)

***Gyraulus laevis* (GASTROPODA: Planorbidae). The Smooth Ramshorn.**

A very local species, more frequent in the north of Britain. In the south of its range it is often found in new or immature gravel pits, where it prefers bare substrata. (M. Kerney, pers. comm.)

***Unio tumidus* (BIVALVIA: Unionidae). A freshwater mussel.**

Confined to central and southern England between Yorkshire and Dorset, but absent from the extreme eastern and south-western counties. This mussel usually inhabits slow rivers and canals, and prefers fresh, clean water. (Ellis, 1978.)

***Dreissena polymorpha* (BIVALVIA: Dreissenidae). The Zebra Mussel.**

This distinctively-coloured mussel has spread during the past 200 years throughout western and northern Europe, reaching England in the 19th century where it is at present locally common in the central part of the country. Often forms dense beds on submerged wood, stones, tree-roots etc. (Ellis, 1978.)



***Orchestla cavimana* (MALACOSTRACA: Talitridae). The Bankhopper.**

A semi-terrestrial relative of the seashore "sandhoppers". Found among grass roots and under stones, etc., in or beside rivers, canals and lakes. First discovered in Britain in 1942, and since recorded from many localities in England, where it is widespread but local. (Fitter and Manuel, 1986.)

***Anax Imperator* (ODONATA: Aeshnidae). The Emperor Dragonfly.**

Locally common in the south of England in large ponds, lakes and canals. (Hammond and Gardner, 1985.)

***Erythromma najas* (ODONATA: Coenagrionidae). The Red-eyed Damselfly.**

Locally common, predominantly in the south of England. Generally associated with large ponds and lakes (Hammond and Gardner, 1985).

***Corixa dentipes* (HETEROPTERA: Corixidae). A lesser water boatman.**

Local to south east England, but rare elsewhere. (J. Bratton, pers. comm.)

***Corixa panzeri* (HETEROPTERA: Corixidae). A lesser water boatman.**

A local and scarce species with a widespread distribution (A.A. Savage, pers. comm.)

***Gerris argentatus* (HETEROPTERA: Gerridae). A pond skater.**

Widespread over England and Wales, but scarce. Prefers ponds and lakes. (A.A. Savage, 1989.)

***Micronecta scholtzi* (HETEROPTERA: Corixidae). A lesser water boatman.**

Limited in range to the south of England and the Midlands. Locally common in rivers and lakes. (Savage, 1989.)

***Sigara conclinna* (HETEROPTERA: Corixidae). A lesser water boatman.**

Local and scarce, often associated with new or disturbed sites. (J. Bratton, pers. comm.; Pond Action, unpublished data.)

***Ranatra linearis* (HETEROPTERA: Nepidae). The Water Stick Insect.**

A local and scarce species which prefers slow-flowing rivers and large bodies of water. (J. Bratton, pers. comm.)

***Agraylea sexmaculata* (TRICHOPTERA: Hydroptilidae). A caddis fly.**

Local throughout Britain, in ponds, lakes and slow-flowing waters, where it feeds on filamentous algae. Often shares its habitat, as here, with the more common *Agraylea multipunctata*. (Wallace, 1991; Pond Action, unpublished data.)

***Ecnomus tenellus* (TRICHOPTERA: Ecnomidae). A caddis fly.**

Locally common in the south of England but rarer elsewhere. Found in slow rivers, canals and lakes. (Wallace, 1991.)

***Oecetis testacea* (TRICHOPTERA: Leptoceridae). A caddis fly.**

Scattered throughout Britain, but until now absent from most of the east, and hence Regionally Notable if found in this area. Prefers a stony substratum in rivers, streams and lakes ("The absence from the east is difficult to understand".) (Wallace, 1991.)