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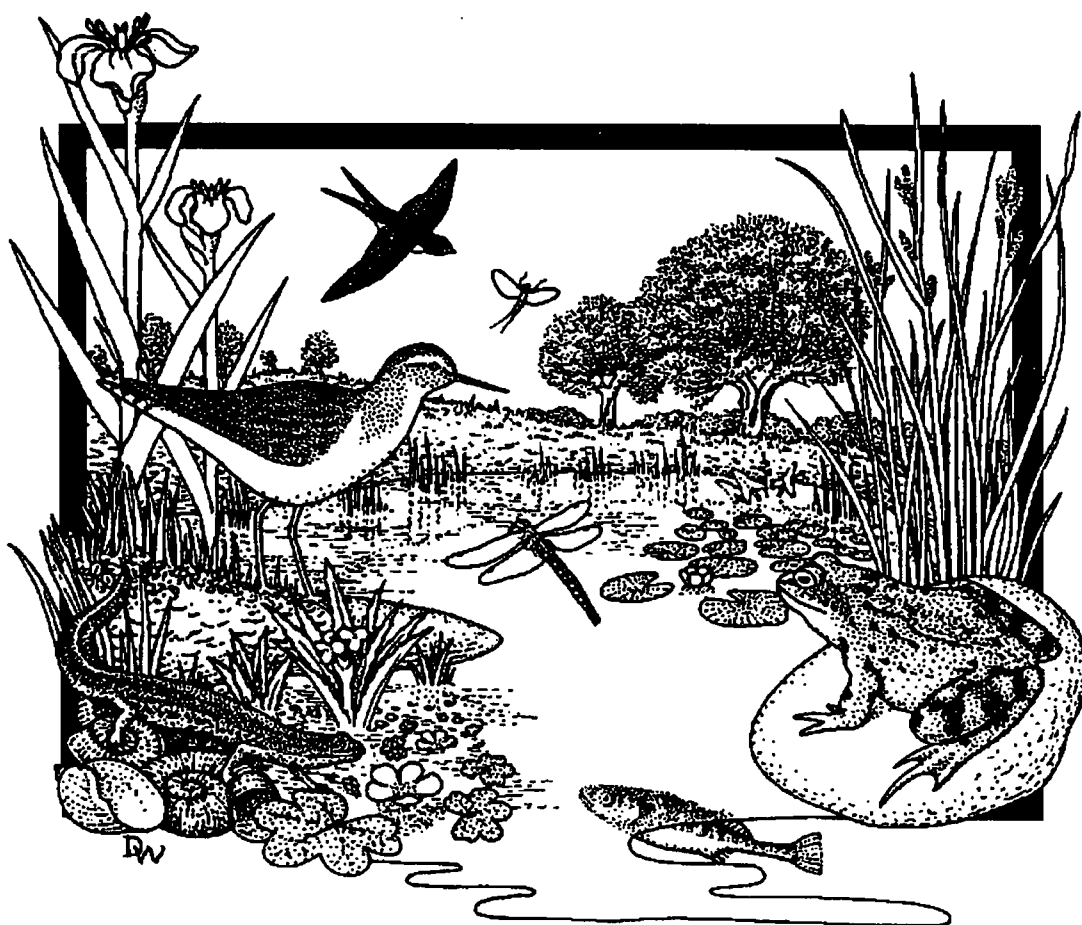
## **SOUTH-WEST OXFORDSHIRE RESERVOIR DEVELOPMENT STUDY (SWORDS)**

### **Crayfish in the River Ock: sites resurveyed in autumn 1993. A study related to the Thames Water Utilities Limited (TWUL) reservoir development proposal**

A report for the National Rivers Authority

and

Thames Water Utilities Limited



### **Pond Action**

October 1993

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# **Crayfish in the River Ock: sites resurveyed in autumn 1993. A study related to the Thames Water Utilities Limited (TWUL) reservoir development proposal**

## **EXECUTIVE SUMMARY**

In 1992 native crayfish (*Austropotamobius pallipes*) were recorded at two sites on the River Ock during SWORDS invertebrate survey work and NRA routine monitoring (NRA Thames Region, pers. comm.). To provide a more detailed picture of the distribution of crayfish in the Ock 13 sites (between Charney Bassett and Abingdon) were surveyed specifically for crayfish in summer 1993. In this survey, however, no crayfish were recorded, suggesting that numbers of animals were either extremely low, or that crayfish were no longer present, in this section of the Ock.

In order to confirm the summer 1993 results, the two sites where crayfish were last recorded in 1992 were resurveyed. This follow-up survey, in September and October 1993, was timed to coincide with the crayfish breeding season when the animals are most active.

The two sites (New Cut Mill and New Ock Bridge near Lyford) were surveyed by searching on site (pond-netting and a visual search) and overnight trapping. No crayfish were recorded at either site, confirming the findings of the more extensive summer survey. In addition, no crayfish have been recorded by the NRA in the Ock catchment in 1993 (NRA Thames Region, pers. comm.).

Available evidence increasingly suggests that native crayfish are no longer present in the Ock; it is recommended that the feasibility of re-establishing the species in the Ock is investigated. An approach to re-establishment, based on a protocol established in NRA South Western Region, is described.

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# **1. INTRODUCTION**

## **1.1 Background**

In 1992 native crayfish (*Austropotamobius pallipes*) were recorded at two sites on the River Ock during macroinvertebrate survey work for the SWORDS study (Pond Action 1992a,b). To provide a more accurate description of the distribution of the species in the Ock, a specific survey for crayfish was undertaken in summer 1993 (Pond Action 1993). In this survey (of 13 sites between Charney Bassett and Abingdon), no crayfish were found, suggesting that numbers were either extremely low, or that crayfish were no longer present in this section of the Ock.

In order to confirm the results of the summer 1993 study, Pond Action recommended that the two sites where crayfish were last recorded in 1992 should be resurveyed during the autumn when crayfish are most active.

# **2. METHODS**

## **2.1 Site Selection**

Surveys were undertaken at the two sites where native crayfish were last recorded on the Ock, New Cut Mill and New Ock Bridge near Lyford (see Table 1). Locations and survey dates for the two sites are shown in Table 2 and Map 1.

## **2.2 Field survey methods**

The two survey sites were carefully searched for crayfish on 22 September 1993, two workers (Antony Corfield and Dave Walker) spending 60-90 minutes at each site. The substrate was carefully examined by hand (flat stones being turned over, crevices examined, etc.) and the whole area swept and kick-sampled with a pond net. Particular attention was paid to overhanging banks, tangles of roots and vegetation.

Traps were set on 11 October 1993. Cylindrical crayfish traps were used, baited with fish and set overnight for collection and examination on the following morning. At New Cut Mill, two traps were employed, whilst at the wider New Ock Bridge site four traps were set. As a result of heavy rain, and consequent rise in water levels, traps at New Ock Bridge could not be recovered until 18 October. Traps at New Cut Mill were retrieved as planned.

**Table 1. Sites and Dates of previous records for *Austropotamobius pallipes* in the River Ock catchment (1988-1993)**

Sites	Grid ref.	Dates	Recorded by:
New Ock Bridge	SU400956	September 1988	NRA
New Ock Bridge	SU400956	June 1989	NRA
New Cut Mill	SU479963	June 1989	NRA
New Cut Mill	SU479963	July 1990	NRA
New Ock Bridge	SU400956	July 1990	NRA
Childrey Brook	SU456953	August 1990	NRA
		October 1990	NRA
Sandford Brook	SU467971	August 1990	NRA
		November 1990	NRA
Sandford Brook	SU467971	February 1991	NRA
New Ock Bridge	SU400956	September 1991	NRA
New Ock Bridge	SU400956	July 1992	Pond Action
New Cut Mill	SU479963	August 1992	Pond Action
		September 1992	NRA

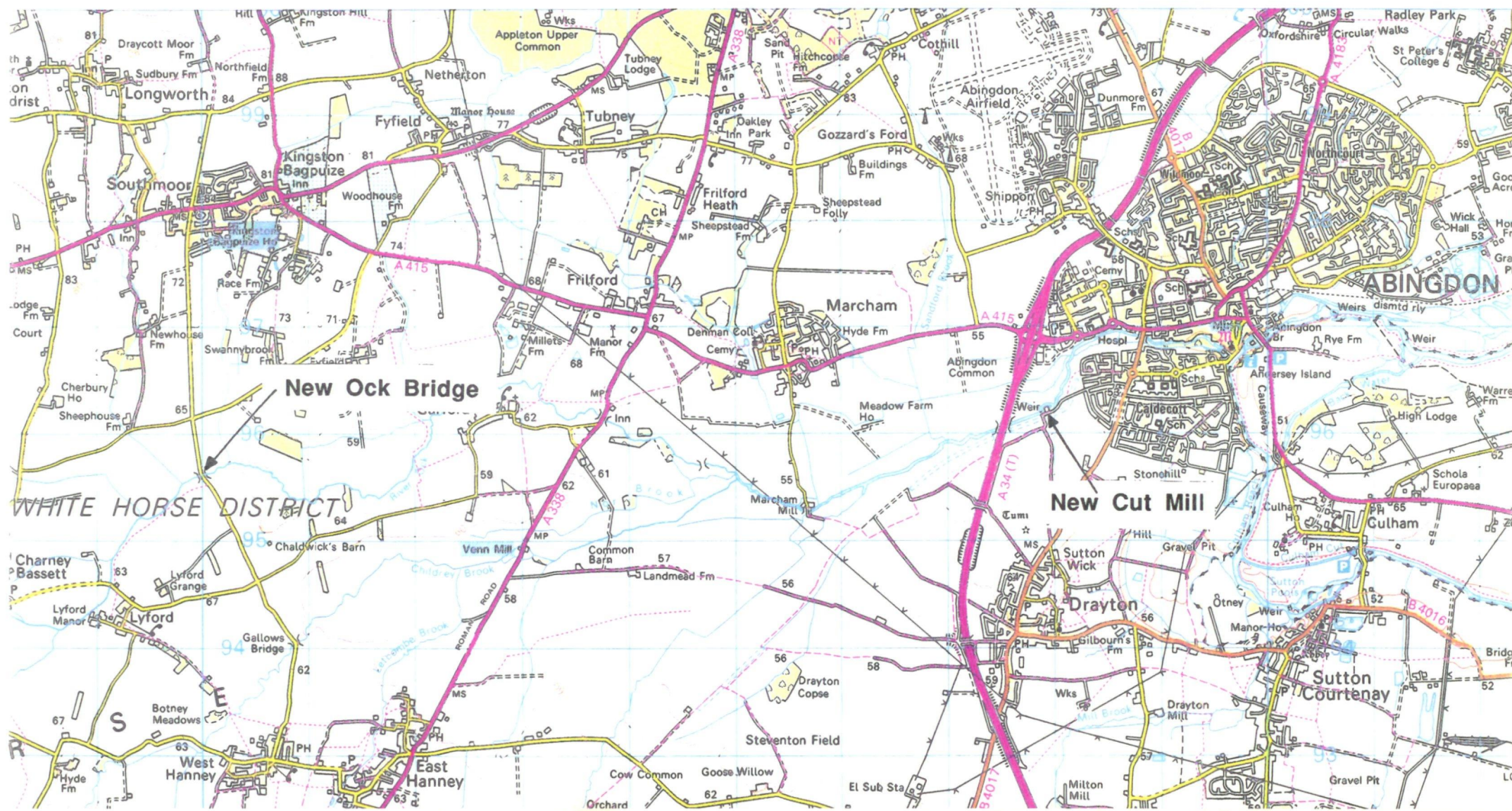
There are no records to date (October 15) in 1993.

**Table 2. *Austropotamobius pallipes* survey of the River Ock: sites trapped and netted by Pond Action in autumn 1993.**

Sites	Grid ref.	Netting	Trapping
New Ock Bridge	SU400956	22 <sup>nd</sup> September	11/12 <sup>th</sup> October
New Cut Mill	SU479963	22 <sup>nd</sup> September	11/18 <sup>th</sup> October



**MAP 1 RIVER OCK: SITES FOR AUTUMN CRAYFISH SURVEY**



### 3. RESULTS AND DISCUSSION

#### 3.1 Results

No crayfish were recorded at either New Cut Mill or New Ock Bridge, Lyford. These results confirm the findings of the more extensive summer survey, which suggested that native crayfish were either no longer present in the Abingdon-Charney Bassett section of the Ock, or present in extremely small numbers.

#### 3.2 Discussion

The follow-up survey was intended to confirm the summer results by searching for crayfish at a time of the year when they are most active. The survey used standard techniques for recording crayfish, the efficiency of which were verified during the summer survey (Pond Action 1993). In addition, during work undertaken by Pond Action at the same time as the Ock study (see Footnote 1) both native crayfish and Signal Crayfish (*Pacifastacus leniusculus*) were easily collected by hand-netting at other sites.

It is unlikely that the failure to record crayfish during the summer was related either to the efficiency of the survey method or the inactivity of the animals.

In the summer survey report we speculated about possible reasons for the decline in native crayfish in the Ock. At present several of the factors which are normally implicated with crayfish declines (Crayfish Plague, loss of habitat and pollution) could be important. There is certainly relatively little suitable habitat in the river and past pollution incidents may have been important. However, water quality at the moment would seem to be good enough. Holditch (1991) noted that most native crayfish populations are in rivers of Class 1A or 1B and all the Ock sites surveyed during the SWORDS study are at least 1B (Pond Action, 1992a). In addition, although there is no firm evidence of Crayfish Plague in the Ock, it is possible that native crayfish in the river could have been exposed to the disease. The occurrence of Signal Crayfish in the Thames at Oxford was noted in the previous report and since then we have also received reports of Signal Crayfish in the Sandford Brook close to the Dry Sandford Pit Nature Reserve, managed by the Berkshire, Buckinghamshire and Oxfordshire Naturalists' Trust (Bob Eeles, personal communication).

#### 3.3 Re-establishment of native crayfish in the Ock

The River Ock has, relatively recently, supported large crayfish populations in some reaches. Discussions with Martin Frayling (NRA South Western Region) indicate that, under certain circumstances, it is possible to re-establish native crayfish populations following plague outbreaks. NRA South Western Region has successfully reintroduced populations in three areas.

For this reason we recommend that the feasibility of re-introducing crayfish into the Ock is investigated to determine whether habitat or Crayfish Plague are the main limiting factors. An outline programme for assessing the feasibility of reintroduction (based on experience gained in NRA South Western Region) is given in Table 3.

1. On 19 September 1993 adult and juvenile Signal Crayfish were recorded at Wolvercote Bridge, Oxford on the River Thames (SP 486094) by hand-netting. On 25 September 1993 juvenile native crayfish were recorded at Adderbury Lakes (near Banbury, SP 476353) also by hand-netting (Pond Action 1993. Management of Adderbury Ponds. A report to Oxfordshire County Council).

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**Table 3. Outline of stages in a crayfish reintroduction programme (based on NRA South Western Region approach to native crayfish reintroduction)**

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**STAGE 1: determine whether sub-catchment is free of crayfish plague**

- Establish distribution of crayfish (natives and introduced species) in catchment under consideration (including crayfish farms). If Signal Crayfish are widespread, or have expanding populations, native crayfish should not be reintroduced.
- If there is a sufficiently large area free of Signal Crayfish, move on to a direct test of the occurrence of Crayfish Plague. Take native crayfish from a plague-free stock and put into cages in river which is subject of potential reintroduction programme (animals will survive in 50cm x 50cm x 50cm cage packed with water plants, regularly replaced). Caged crayfish should be maintained for 6-12 months. If they survive throughout this period it can be assumed (although not guaranteed) that crayfish plague is not present.
- At the end of the trial period animals may be checked for Crayfish Plague infection by MAFF.

If this stage is successful (i.e. there is no evidence of Crayfish Plague), go on to Stage 2, the full reintroduction programme.

**STAGE 2: ensure that suitable habitat is available for crayfish in the Ock.**

- Assuming that Crayfish Plague is not present, habitat quality should then be assessed. Existing SWORDS data may be adequate for this assessment.
- If necessary, areas where habitat improvement work for crayfish (and other plants and animals) should be identified and works undertaken. Once enough suitable habitat is available go to Stage 3.

**STAGE 3: re-introduce crayfish**

- Take mature animals (preferably berried females) from established population free of crayfish plague.
  - Place in cages in release sites for several days, allowing them to become accustomed to the new environment.
  - After several days, release the animals from captivity. Provided that habitat is adequate animals should successfully establish. A small number of release sites, where a high density of animals can be established, should be used. If animals are dispersed widely males may not be able to locate females during the breeding season.
  - Monitor success of re-establishment.
-



#### **4. REFERENCES**

- Goddard, J. S. and Hogger, J. B. (1986).** The current status and distribution of freshwater crayfish in Britain. *Field Studies* **6**, 383 - 396.
- Holdich, D. (1991).** The Native Crayfish and Threats to its Existence. *British Wildlife* **II.3**, 141 - 151.
- Pond Action (1992a).** Macroinvertebrate study related to Thames Water Utilities Limited (TWUL) reservoir development proposal: Phase 1 of the Ock and Thames catchments. A report for the National Rivers Authority and Thames Water Utilities Limited.
- Pond Action (1992b).** Macroinvertebrate study related to Thames Water Utilities Limited (TWUL) reservoir development proposal: Phase 2 surveys of the Ock catchment. A report for the National Rivers Authority and Thames Water Utilities Limited.
- Pond Action (1993).** Crayfish in the River Ock: a study related to Thames Water Utilities Limited (TWUL) reservoir development proposal. A report for the National Rivers Authority and Thames Water Utilities Limited.



New Ock Bridge, from bridge looking upstream.



New Cut Mill. Taken from left bank looking upstream.

## **Appendix 1. Field data sheets**

# THAMES WATER

## REGULATION AND MONITORING

### BIOLOGY

## FIELD DATA SHEET

SAMPLE NO. *n/a*

DATE *22/09/93*  
TIME

DISTRICT  
CATCHMENT  
TERCOURSE  
NAME  
SITE CODE  
D. REF.

RIVER OCK  
NEW OCK BRIDGE  
POCR-0017  
SU400956

SAMPLED BY  
SAMPLE METHOD

REACH CODE  
REACH POINT

ROO

EM. QUALITY FROM TO

ASSOCIATED WATER SAMPLES  
(C - Chemical, B - Bacteriological)

REASON FOR SAMPLING  
ORIGIN OF REQUEST

SWORDS STUDY  
NRA THAMES

#### SITE DETAILS

*n/a. Crayfish survey (by netting + trapping) not RIVPACS related survey.*

##### 'PREDICTION' DETAILS

Mean width m  
Mean depth cm

##### STRATUM COMPOSITION (4 CATEGORIES)

(>256 mm) Boulders %  
(64-256 mm) Cobbles %  
(16-64 mm) Pebbles %  
(2-16 mm) Gravel %  
(0.0625-2 mm) Sand %  
(0.004 - 0.0625 mm) Silt %  
(< 0.004 mm) Clay %  
Altitude m  
Longitude  
East (E) or West (W)  
Latitude  
Distance from source km  
Slope m/km  
Discharge category  
Air temperature range °C  
Mean air temperature °C

##### HABITAT

Pool  
Slack  
Riffle  
Run  
Depositing  
Eroding  
Canalised

##### INFLUENCES

Weed cutting  
Dredging  
Bank maintenance  
Flow management

##### LAND USE

Urban  
Arable  
Grazing  
Private Cultivated  
Deciduous Woodland  
Coniferous Woodland

##### SHADING

Nil/Light  
Moderate  
Heavy

##### FLOW (cm/sec)

(<10) Slack  
(10-25) Slow  
(25-50) Moderate  
(50-100) Fast  
(>100) Spate

Macrophyte cover %  
Water temperature °C

#### RESULTS

*n/a*

PREVIOUS RESULTS (see SWORDS study reports)

Date

AWP Score  
AWP ASPT  
Bio Class

edicted BMWP Score  
Predicted BMWP ASPT

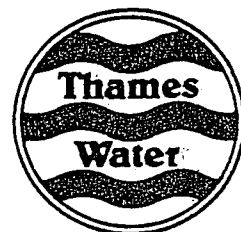
Ratio - Actual Score: Predicted Score  
Ratio - Actual ASPT: Predicted ASPT

FBA GP  
Suitable? Y N

#### COMMENTS

Site Sketch (overleaf)

Photos taken



igned Date

# THAMES WATER

## REGULATION AND MONITORING

### BIOLOGY

## FIELD DATA SHEET

SAMPLE NO. *n/a*

DATE *22/09/93*

DISTRICT *RIVER OCK*  
 CATCHMENT *NEW CUT MILL*  
 TER COURSE *POCR 0014*  
 E NAME *SU479963*  
 SITE CODE  
 ID. REF.

SAMPLED BY  
 SAMPLE METHOD

ACH CODE  
 REACH POINT

EM. QUALITY FROM TO

ASSOCIATED WATER SAMPLES  
 (C - Chemical, B - Bacteriological)

ASON FOR SAMPLING *SWORDS STUDY*  
 ORIGIN OF REQUEST *NRA THAMES*

UTE DETAILS *n/a Crayfish survey (by netting + trapping) not RIVPACS related survey.*

#### A 'PREDICTION' DETAILS

Mean width  
 Mean depth

#### IBSTRATUM COMPOSITION (4 CATEGORIES)

(>256 mm) Boulders  
 (64-256 mm) Cobbles  
 (16-64 mm) Pebbles  
 (2-16 mm) Gravel  
 (0.0625-2 mm) Sand  
 (0.004 - 0.0625 mm) Silt  
 (< 0.004 mm) Clay  
 Altitude  
 Longitude  
 East (E) or West (W)  
 Latitude  
 Distance from source  
 Slope  
 Discharge category  
 Air temperature range  
 Mean air temperature

#### HABITAT

Pool  
 Slack  
 Riffle  
 Run  
 Depositing  
 Eroding  
 Canalised

#### INFLUENCES

Weed cutting  
 Dredging  
 Bank maintenance  
 Flow management

#### LAND USE

Urban  
 Arable  
 Grazing  
 Private Cultivated  
 Deciduous Woodland  
 Coniferous Woodland

#### SHADING

Nil/Light  
 Moderate  
 Heavy

#### FLOW (cm/sec)

(<10) Slack  
 (10-25) Slow  
 (25-50) Moderate  
 (50-100) Fast  
 (>100) Spate

Macrophyte cover  
 Water temperature

#### ESULTS *n/a*

#### PREVIOUS RESULTS *(see SWORDS study reports)*

Date

WVP Score  
 WVP ASPT  
 Bio Class

redicted BMWP Score  
 redicted BMWP ASPT

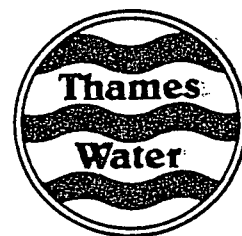
Ratio - Actual Score: Predicted Score  
 Ratio - Actual ASPT: Predicted ASPT

FBA GP  
 Suitable? Y N

#### OMMENTS

Site Sketch (overleaf)

Photos taken



igned Date