NATIONAL RIVERS AUTHORITY

THAMES REGION

UPPER THAMES AREA

H10

GRAND UNION CANAL (AYLESBURY ARM)

FISHERIES SURVEY

1992

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Ref.AGY92

Published December 1992

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1. SUMMARY

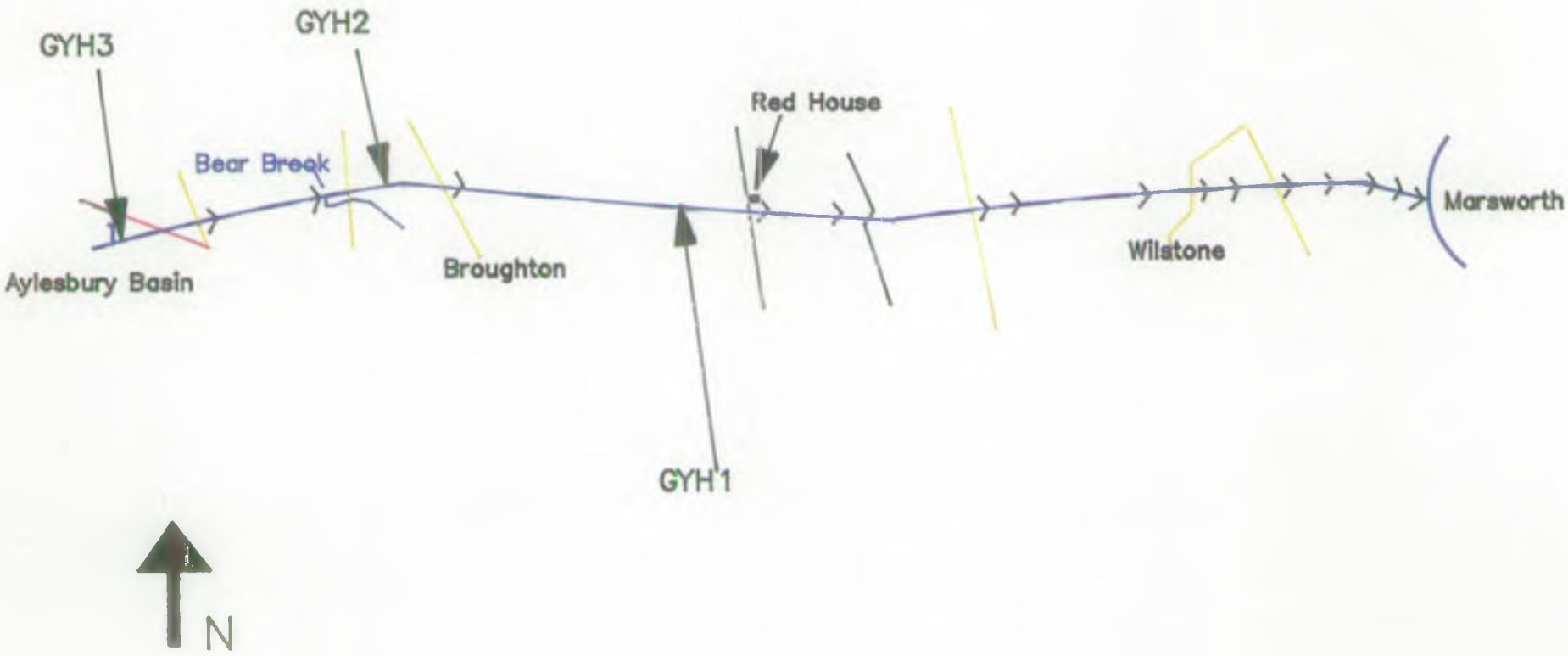
The GUC (Aylesbury Arm) was surveyed between February and April 1992. All of the Aylesbury Arm is E.C. designated cyprinid fishery.

Excellent fish populations were found in both Red House and Oakfield pounds exceeding the target biomass. It is likely that these populations have been increased as a result of dewaterings in the upper pounds of the canal.

The final pound including the Aylesbury Basin produced few fish, however results were not quantitative due to poor electrofishing efficiency.

Water quality and habitat were generally poorer in the final two pounds due to the effects of urbanisation (surface water run-off, artificial banks, litter).

Grand Union Canal (Aylesbury Arm)



2. INTRODUCTION

2.1.DESCRIPTION OF WATERCOURSE

The Aylesbury Arm was opened in 1814 linking Aylesbury (grid reference SP822136) with the Grand Union Canal at Startops End near Marsworth (SP917144). The canal is approximately 10km long and rises approx 29metres (94ft 8ins) using a total of 16 locks.

2.2.GEOLOGY AND HYDROLOGY

Water is supplied by the Tring reservoirs. The overflow from the Aylesbury Basin, the lowest point on the canal, is the source of the California Brook, which joins the Bear Brook before reaching the River Thame.

2.3.CONSENTED DISCHARGES

There are no major consented discharges to the canal, however storm discharges in Aylesbury can affect the last 2 pounds.

2.4.FISH MORTALITIES

There have only been 2 minor fish mortalities reported during the last 5 years. The most recent incident caused by storm water required emergency aeration of the Aylesbury Basin to prevent a major fish kill. British Waterways started operations with 2 small pumps which were replaced by the AerO2 mobile aeration unit deployed by NRA fisheries staff.

2.5.FISHERIES MANAGEMENT WORK (see appendix v)

There has been a significant amount of stocking and transferring of fish, during the past 5 years. Many of these fish were moved from Oakfield pound during a fish rescue.

2.6.ENGINEERING WORKS

During 1992 there have been a number of planned draindowns for repairs to locks at the Marsworth end of the canal (British Waterways). There was also a draindown of the 1km long Oakfield pound to enable the NRA-Thames Region to carry out major improvements/repairs to the Bear Brook syphon.

Several unplanned dewaterings have been caused by vandals leaving lock gates open.

The dewaterings are likely to have caused a significant redistribution of fish populations in the short term.

3. AIMS AND OBJECTIVES

3.1.OVERALL AIMS OF SURVEYS

The National Rivers Authority has a statutory obligation to maintain, improve and develop inland fisheries. To assist in meeting this obligation, NRA Thames Region fisheries staff have engaged upon a 5 year rolling programme of riverine fish population surveys to establish baseline data for each major watercourse in the Thames catchment.

The Grand Union Canal (Aylesbury Arm) was not part of the rolling programme, however circumstances provided an opportunity to gather information.(see 3.3. Specific Aims)

3.2.RIVER CLASSIFICATION

River water quality is classified according to the National Water Council River Quality Objectives 1978 (RQO's), (as amended by Thames Water Authority 1987).

Under the European Community Directive (78/659/EEC), some river zones are designated as capable of supporting either salmonid or cyprinid fish

(Further details of the N.W.C. classification and the E.C. directive appear in the appendices).

The NRA.Thames region have developed a site code classification system based upon the RQO's and the E.C. directive. (Appendix) Fish biomass targets apply within the NRA Thames Region with respect to E.C.designated fisheries, viz-

Cyprinid - 20g/sqm
Salmonid - 15g/sqm

3.3.SPECIFIC AIMS

The NRA-Thames Region were carrying out major works/repairs to the Bear Brook syphon (where the Bear Brook flows under the Aylesbury Arm). This necessitated the planned dewatering of Oakfield pound by British Waterways, and a fish rescue. The fish rescue was originally to have been carried out by British Waterways at some considerable cost to the NRA. A compromise was reached with BW Fisheries to carry out a joint operation whereby they assisted us with the rescue and a survey site and we would assist them in culling the final pound, including the Aylesbury Basin. (This section is not fished and the fish were to be transferred further up the canal).

The survey is an amalgam of 1 survey site, 1 fish rescue and 1 cull.

4.METHODS

4.1 SITE SELECTION (see 3.3. SPECIFIC AIMS)

The Red House Pound Site (GYH1) was selected as being a good representative site for the canal. Red House Pound is a long pound and therefore likely to be less affected by dewatering incidents, etc. The other 2 sites involved other fishery operations (rescue and cull) and data was collected as a "by-product". Time constraints precluded surveying in the section of canal affected by dewaterings.

4.2 CAPTURE AND DATA ACQUISITION

Red House (site ref:GYH1)-Catch depletion electrofishing techniques using pulsed D.C.equipment were employed. All fish captured were enumerated by species. Fork length was measured to the nearest mm. A subsample of up to 40 fish of each species at each site was weighed to the nearest gram. Scale samples from the shoulder of up to 3 fish from each 1cm size class were taken for age estimation.

Minor species such as stoneloach(Noemacheilus barbatulus), minnow (Phoxinus phoxinus) and bullhead(Cottus gobio) were noted for relative abundance.

Other relevant site details were taken and appear in the site reports.

Oakfield Pound (site ref:GYH2)-fish were caught using electrofishing equipment fished from a boat or wading. A complete fish removal was the aim, however no individual fish measurements were carried out due to time constraints.

Aylesbury Basin (site ref:GYH3)-the fish cull was carried out using boat electrofishing techniques. (2 hand held electrodes from a boat, or a boom boat)

4.3 DATA ANALYSIS

The data was processed on the computer using the fisheries information system (FINS) software package. Graphics were generated using Freelance Plus V.3.0.

4.4 MACROINVERTEBRATES

N.R.A. biological staff are engaged upon a biological monitoring programme of the main watercourses in the region. Macroinvertebrate data from this source is presented in this report. (Appendix iv)

Invertebrate samples tend to reflect the physico-chemical variations which occur in the river and this provides a means of monitoring the aquatic environment on a continuous basis. The results were evaluated using the Biological Monitoring Working Party (BMWP) scoring system.

4.5 WATER QUALITY

River Quality Objectives are set according to present water quality conditions and the uses to which the river is subjected. Discharge consents are determined by the R.Q.O. and by the total load of pollutants. N.R.A. pollution inspectors take routine samples from consented discharges to monitor compliance with consent conditions, and from river points to assess that the R.Q.O. is being met. River and discharge samples are also taken following reports of pollution.

The samples are analysed for different parameters depending on the source of the sample. The 3 main parameters are Biological Oxygen Demand (B.O.D.), Ammonia and suspended solids. Routine sample results are held on a register available for public inspection.

SITE REPORT

WATERCOURSE: GUC (Aylesbury Arm)

SITE NAME: Red House SITE CODE: GYH1

LOCATION: Approx 300m downstream of Red House Lock

N.G.R.: SP869140 DATE FISHED: 4/2/92

METHOD: Electrofishing from a boat, 2 anodes, outboard motor

E.C. TARGET BIOMASS: $20gm^{-2}$

HABITAT FEATURES

LENGTH: 112m WIDTH: 7.9m AREA: $885m^2$ DEPTH: 1.3m

WATER TEMPERATURE: $6^{o}C$

SUBSTRATE COMPOSITION (%)

BARE: 1 MUD & SILT: 99 GRAVEL: 0 STONE: 0 BOULDER:

VEGETATION (% COVER)

SUBMERGED: 0 FLOATING: 0 EMERGENT: 10 SHADE: 5

DOMINANT PLANT SPECIES: Phragmites in left margin, Phalaris on right bank

WATER FLOW: Virtually static (trickle overtopping lock gates and no boat traffic).

WATER CLARITY: Turbid

PHYSICAL STRUCTURE OF SITE: Straight, constant width, relatively deep with 1.5m in middle and 1m on the marginal shelves. Thick layer of silt (0.3-0.4m).

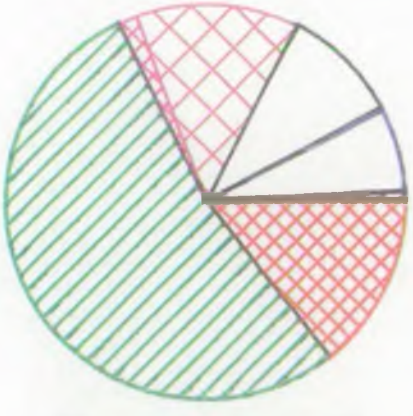
ADJACENT LAND USE: L.B. Towpath, beyond which arable.
R.B. Rubble track still under construction, beyond which arable.

ADDITIONAL OBSERVATIONS: The majority of the fish caught at this site were among the "fringe" of Phragmites. Very few gudgeon were caught in the survey, however several were tangled in the stop net. This suggests that our catch efficiency for this bottom-feeding species was poor. Electrofishing equipment is also less efficient at catching small fish than large fish and this site was dominated by small roach. The estimates for biomass and especially for density are likely to be less than the true fish population at this site. Despite this the site achieved the target biomass with $23.5gm^{-2}$

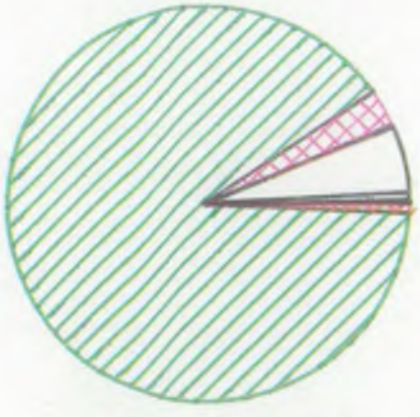
RIPARIAN OWNERS: British Waterways
FISHING RIGHTS: Aylesbury and District Isaak Walton Angling Association

Site GYH1 Red House Biomass and Density

	Biomass (gm−2)	Density (nm−2)
BREAM	0.2	0.002
COMMMON CARP	1.6	0.001
GUDGEON	0.1	0.007
PERCH	2.3	0.059
PIKE	3.1	0.003
RUDD	0.4	0.032
ROACH	12.6	0.976
TENCH	3.4	0.008
TOTAL	23.5	1.152

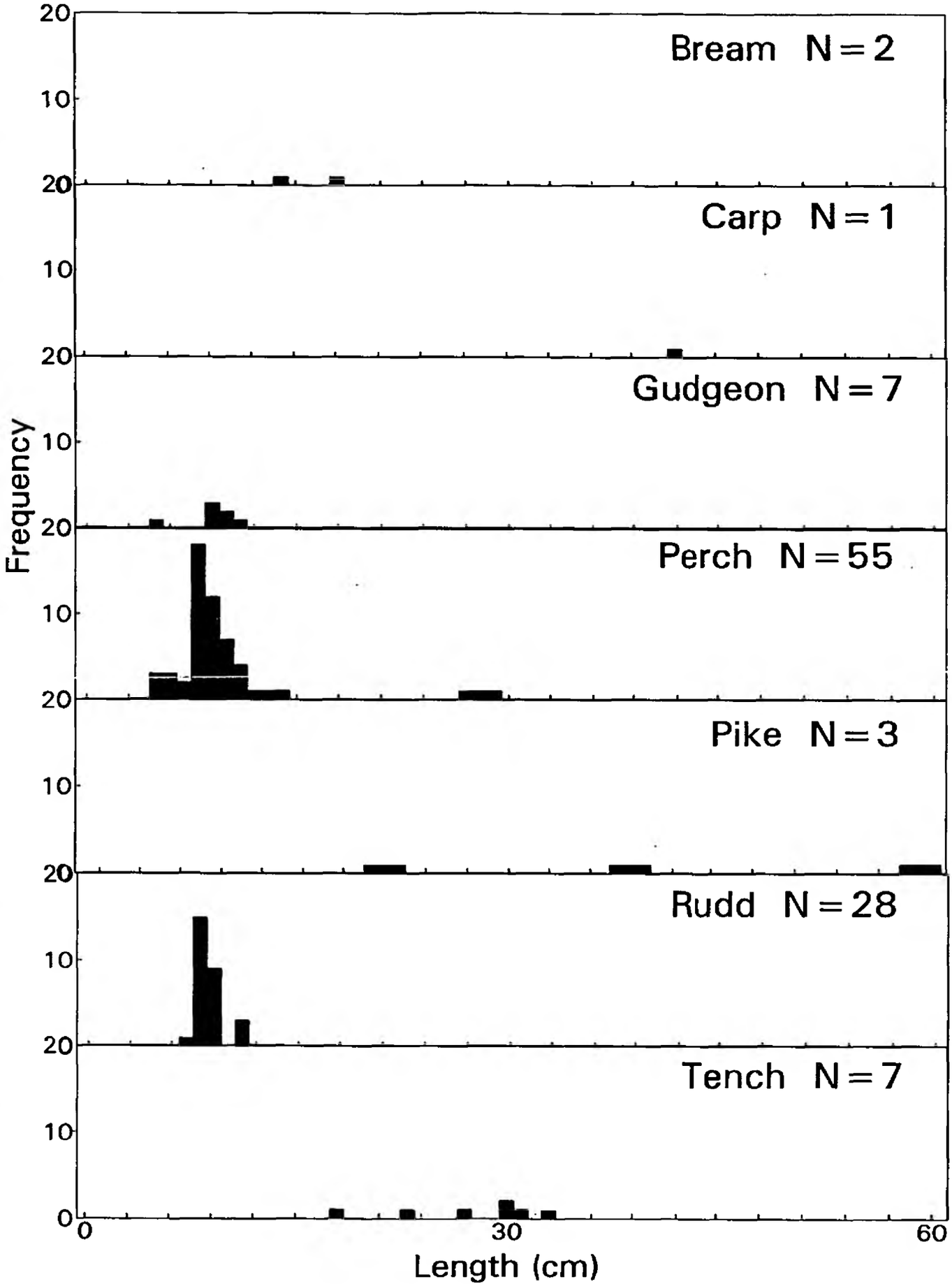


Biomass (gm−2)

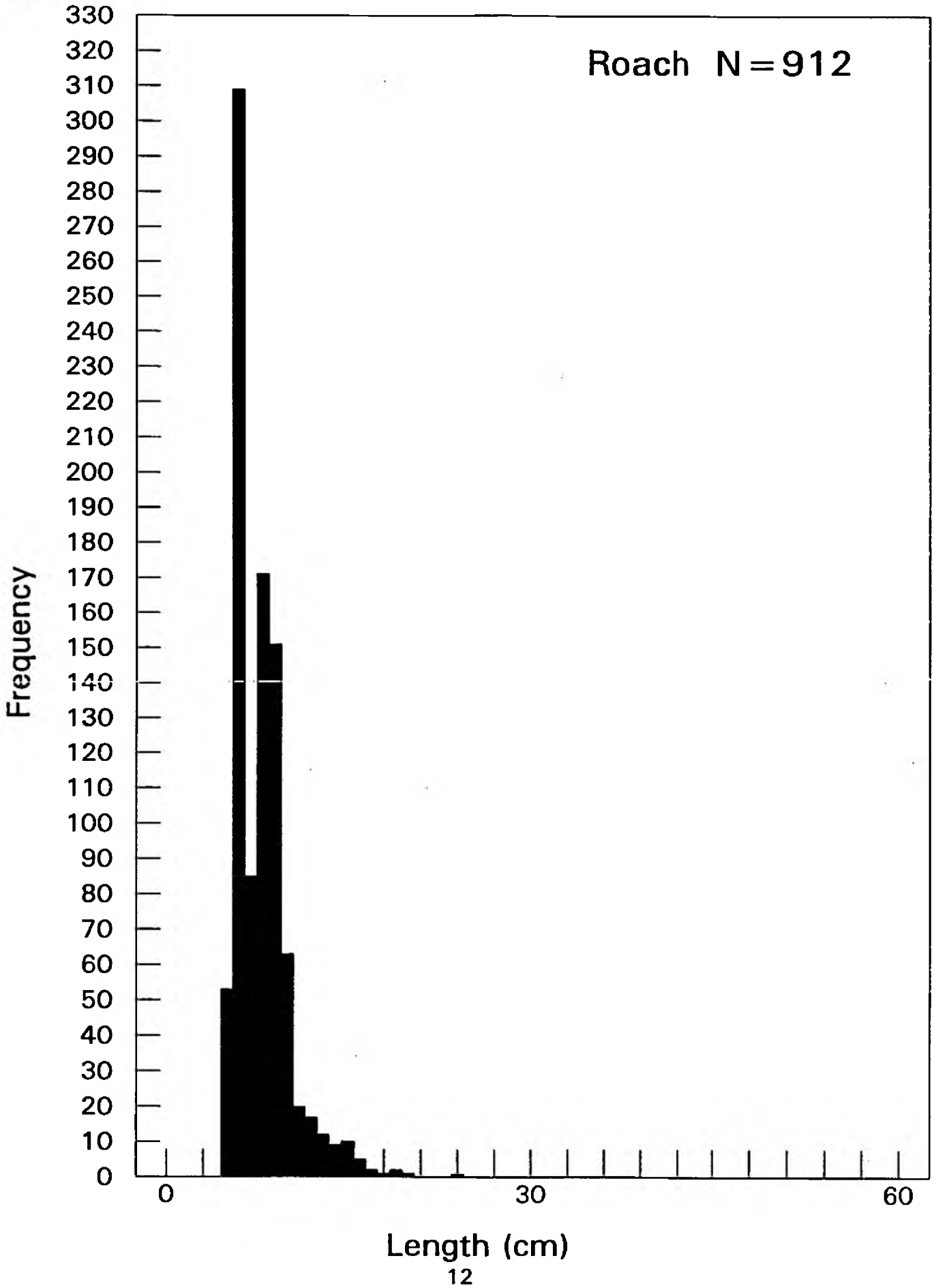


Density (nm−2)

Site GYH1 Red House Length Frequency (1)



Site GYH1 Red House Length Frequency (2)



SITE REPORT

WATERCOURSE: G.U.C.(Aylesbury Arm)

SITE NAME: Oakfield Pound (between locks 14 & 15) SITE CODE: GYH2

LOCATION: Upstream of Bear Brook Syphon

N.G.R.: SP844142 to SP832139 DATE FISHED: 10-14/2/92

METHOD: Electrofishing, wading and from a boat.

R.Q.O.: 2A E.C. TARGET BIOMASS: $20gm^{-2}$

HABITAT FEATURES

LENGTH: 1250m MEAN WIDTH: 8m

AREA: $10000m^2$ MEAN DEPTH (RANGE): 1.3m (1-1.5m)

SUBSTRATE COMPOSITION (%)

BARE: 0 MUD & SILT: 93 GRAVEL: 5 STONE: 2 BOULDER: 0

VEGETATION (% COVER)

SUBMERGED: 0 FLOATING: 0 EMERGENT: 0 SHADE: 10

WATER CLARITY: Very poor

PHYSICAL STRUCTURE OF SITE: straight, constant width except at 3 bridges and 2 locks. Good habitat/cover provided by riparian trees with extensive root systems in the R.B. margin downstream of the ring road.

Large quantities of urban junk including motorcycles, traffic cones, etc created a hazard for fisheries staff. Some of the junk could cause pollution (eg oil from motorcycle), it may also provide in stream cover for fish.

ADJACENT LAND USE: L.B. Permanent pasture, residential downstream of last bridge. Towpath.
ADJACENT LAND USE: R.B. Permanent pasture, Industrial Estate downstream of last bridge.

RIPARIAN OWNERS: British Waterways

FISHING RIGHTS: A & D.I.W.A.A.

COMMENTS: No individual lengths and weights were recorded at this site as it was primarily a fish rescue during a drain down operation. An estimated 980kg of fish were rescued including 105 carp (approximately 525kg). (Estimated total biomass based on batch weight/bin multiplied by the number of bins full of fish transferred). Tens of thousands of roach, perch and gudgeon were caught as well as hundreds of tench, crucian carp and bream. There were few pike to crop this abundant food supply. Specimen fish included perch to over 1kg (2lbs 4oz) and carp to 8kg (17lbs).

The estimated biomass of $98gm^{-2}$ ($53gm^{-2}$ of carp) easily exceeds the target. It is likely that this pound has gained extra fish from pounds further up the canal:-vandals have on several occassions recently opened up the lock gates releasing most of the water and presumably a large number of fish.

SITE REPORT

WATERCOURSE: GUC (Aylesbury Arm)

SITE NAME: Aylesbury Basin SITE CODE: GYH3

LOCATION: Final pound ending at Aylesbury Basin

N.G.R.: SP822136 DATE FISHED: 29/4/92

METHOD: Electrofishing from a boat, 2 anodes. Also used British Waterways boom boat.

R.Q.O.: 2A E.C. TARGET BIOMASS: 20gm^{-2}

HABITAT FEATURES

LENGTH: 600m MEAN WIDTH (RANGE): 8m (2.5-12)

AREA: 4800m^2 MEAN DEPTH : 1.4m

SUBSTRATE COMPOSITION (%)

BARE: 0 MUD & SILT: 100 GRAVEL: 0 STONE: 0 BOULDER: 0

VEGETATION (% COVER)

SUBMERGED: 0 FLOATING: 2 EMERGENT: 5 SHADE: 10

WATER CLARITY: poor

PHYSICAL STRUCTURE OF SITE: Straight. Width narrow at bridges, wide at basin with side arm for boat manoevering. Very little "natural" bank.

ADJACENT LAND USE: L.B. Towpath, then urban.
" " " R.B. Residential and Industrial.

RIPARIAN OWNERS & FISHING RIGHTS: British Waterways

COMMENTS: 20kg of fish were caught (a minimum biomass of 4.2gm^{-2}). This was a very dissappointing result, however it is likely that we were inefficient in the basin due to the large numbers of boats. The few bream caught came from this vicinity, and angling catches of bream were usually taken in this area. Approximately 20 dead fish were observed (probably spawning stress) and oil/fuel slicks were on the surface of the canal. The only recently reported incident was an oil pollution in December '91, which is unlikely to have had any effect on the fish.

6.DISCUSSION

The survey site GYH1 in the Red House pound produced a biomass of 23.5 gm^{-2} exceeding the target. The depth, and high turbidity would have reduced our efficiency. The species composition, large numbers of small fish and the observation of numerous gudgeon in the stop nets suggest that the true biomass would be much higher. 8 species of fish were caught with roach dominating by numbers and weight.

GYH2, the Oakfield pound, was drained for engineering works to be carried out to the Bear Brook syphon. Virtually all the fish were rescued, to be transferred to pounds higher up the canal. The biomass was dominated by 105 large carp, however there was a good diversity of species and excellent recruitment of roach, perch and gudgeon. Recent dewatering of pounds upstream will certainly have contributed to the estimated biomass of 98gm^{-2}. (N.B. When Oakfield pound was dewatered there still remained huge quantities of fish particularly in deeper pools near locks or under bridges, it is likely that other pounds behave similarly).

GYH3 was a fish cull in the final pound including the Aylesbury Basin. The estimated biomass of 4.2gm^{-2} was very poor. The basin is known to have a good population of large bream (angling catches) and we were very inefficient here due to the expanse of water and the large number of parked boats. It is less clear why so few fish were caught in the rest of the pound, (in GYH1 23.5 gm^{-2} were caught from a similar width and depth of canal) but it is probably a combination of poor efficiency, poor habitat and poorer water quality.

Similar problems of poor efficiency were noted in the Fisheries Survey of the Thames East & Metropolitan GUC 1987. It was noted that the only reliable biomass estimate in the survey came from fish rescues.

Throughout the canal, habitat is similar being mostly straight with a central channel and lateral shelves. The bed is dominated by mud and silt. Differences between sites include:- predominance of hard construction methods (piling, brickwork, concrete) used for the banks in the pounds in Aylesbury, extensive beds of emergent vegetation in Red House pound, excellent riparian trees with extensive underwater root systems in Oakfield pound. Cover is at a premium in a canal and so these features can have significant implications for fish populations.

Water quality is largely determined by the feed from the main GUC. The canal is generally higher than the surrounding land and it is only in Aylesbury that it receives surface water run-off. The only reported fish mortalities in the last 5 years (appendix vi) have been within Aylesbury. One of these was attributed to storm water run-off flushing detritus into the canal. There have also been a number of pollution incidents in Aylesbury that did not cause mortalities. Water quality results (Appendix IV) showed that the RQO of 2A was met in 1991/1992 however prior to that only class 3 was achieved.

Biological monitoring results (Appendix IV) are consistent with the moderate water quality.

There have been large numbers of fish stocked to the GUC (Aylesbury Arm) (Appendix IV) however the angling clubs still complain of poor catches and request more restocking. It is likely that there has been a net downstream migration of fish as a result of dewaterings and angling catches are reported as being particuarly poor in the upper pounds. Some natural redistribution will occur as fish migrate back upstream through the locks from the densely populated pounds (anecdotal evidence, also observations/experience of British Waterways Fisheries personnel). The fish populations in these upper pounds will be further augmented with planned stockings by the NRA and British Waterways.

7.CONCLUSIONS

(i) Excellent fish populations were found in both Red house and Oakfield pounds. Good habitat features and downstream movement of fish due to dewaterings were important factors.

(ii) The final pound including the Aylesbury Basin produced few fish. Poor electrofishing efficiency particuarly in the basin meant that the results were only qualitative. Water quality and habitat were poorer in this pound due to the effects of urbanisation.

(iii) Recolonisation of the top pounds is likely to occur naturally. Restocking will speed up the process.

8.RECOMMENDATIONS

(i) Carry out fish stocking in pounds with depleted fish populations (resulting from dewaterings), for the benefit of anglers. Ideally the overstocked lower pounds would be culled for this purpose.

Consider habitat improvements such as:-
(ii) tree planting
(iii) establishment of aquatic macrophytes (eg reed bed)
(iv) use of soft engineering such as willow spiling instead of concrete or metal bank reinforcing.

(v) Investigate surface water discharges in Aylesbury to try prevent sporadic pollutions.

(vi) Investigate other methods for surveying the fish populations of the Aylesbury Basin.

9.REFERENCES

J.Ellis (British Waterways) - Fish migration through canal locks. Personal Communication

Thames East & Metropolitan Grand Union Canal Fisheries Survey 1987 NRA Thames Region Internal Report

APPENDIX I

River quality classification

River Class	Quality criteria	Remarks	Current potential uses
	Class limiting criteria (95 percentile)		
1A Good Quality	(i) Dissolved oxygen saturation greater than 80% (ii) Biochemical oxygen demand not greater than 3 mg/l (iii) Ammonia not greater than 0.4 mg/l (iv) Where the water is abstracted for drinking water, it complies with requiurements for A2* water (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 1.5 mg/l (ii) Visible evidence of pollution should be absent	(i) Water of high quality suitable for potable supply abstractions and for all other abstractions (il) Game or other high class fisheries (iii) High amenity value
1B Good Quality	(i) DO greater than 60% saturation (ii) BOD not greater than 5 mg/l (iii) Ammonia not greater than 0.9 mg/l (iv) Where water is abstracted for drinking water, it complies with the requirements for A2* water (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 2 mg/l (ii) Average ammonia probably not greater than 0.5 mg/l (iii) Visible evidence of pollution should be absent (iv) Waters of high quality which cannot be placed in Class 1A because of the high proportion of high quality effluent present or because of the effect of physical factors such as canalisation, low gradient or eutrophication (v) Class 1A and Class 1B together are essentially the Class 1 of the River Pollution Survey (RPS)	Water of less high quality than Class 1A but usable for substantially the same purposes
2 Fair Quality	(i) DO greater than 40% saturation (ii) BOD not greater than 9 mg/l (iii) Where water is abstracted for drinking water it complies with the requirements for A3* water (iv) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 5 mg/l (II) Similar to Class 2 of RPS (iii) Water not showing physical signs of pollution other than humic colouration and a little foaming below weirs	(i) Waters suitable for potable supply after advanced treatment (ii) Supporting reasonably good coarse fisheries (iii) Moderate amenity value
3 Poor Quality	(i) DO greater than 10% saturation (ii) Not likely to be anaerobic (iii) BOD not greater than 17 mg/l. This may not apply if there is a high degree of re-aeration	Similar to Class 3 of RPS	Waters which are polluted to an extent that fish are absent or only sporadically present. May be used for low grade industrial abstraction purposes. Considerable potential for further use if cleaned up
4 Bad Quality	Waters which are inferior to Class 3 in terms of dissolved oxygen and likely to be anaerobic at times	Similar to Class 4 of RPS	Waters which are grossly polluted and are likely to cause nuisance
X	DO greater than 10% saturation		Insignificant watercourses and ditches not usable, where the objective is simply to prevent nuisance developing

Notes

(a) Under extreme weather conditions (eg flood, drought, freeze-up), or when dominated by plant growth, or by aquatic plant decay, rivers usually in Class 1, 2 and 3 may have BODs and dissolved oxygen levels, or ammonia content outside the stated levels for those Classes. When this occurs the cause should be stated along with analytical results.

(b) The BOD determinations refer to 5 day carbonaceous BOD (ATU). Ammonia figures are expressed as NH_4.

(c) In most instances the chemical classification given above will be suitable. However, the basis of the classification is restricted to a finite number of chemical determinands and there may be a few cases where the presence of a chemical substance other than those used in the classification markedly reduces the quality of the water. In such cases, the quality classification of the water should be down-graded on the basis of biota actually present, and the reasons stated.

(d) EIFAC (European Inland Fisheries Advisory Commission) limits should be expressed as 95 percentile limits.

* EEC category A2 and A3 requirements are those specified in the EEC Council Directive of 16 June 1975 concerning the Quality of Surface Water Intended for Abstraction of Drinking Water in the Member State.

APPENDIX II N.R.A. - THAMES REGION. RIVER QUALITY OBJECTIVE PARAMETERS

Class 1A - High quality waters

1. Suitable for potable supply at defined abstraction points, and
2. Suitable for all other abstractions, and
3. Suitable for game or any other high class fisheries, (complying with the requirements of Directive 78/659/EEC for salmonid waters), and
4. Of high amenity value.

Class 1B - High quality waters

1. Used for the transport of high proportions of sewage effluent, trade effluent or urban run-off, and
2. Suitable for potable supply at defined abstraction points, and
3. Suitable for all other abstractions, and
4. Suitable for game or any other high class fisheries, (complying with the requirements of Directive 78/659/EEC for salmonid waters), and
5. Of high amenity value.

Class 2A - Fair quality waters

1. Suitable for potable supply after advanced treatment at defined abstraction points, and
2. Suitable for agricultural uses, and
3. Capable of supporting good coarse fisheries, (complying with the requirements of Directive 78/659/EEC for cyprinid waters), and
4. Of moderate amenity value.

Class 2B - Fair quality waters

1. Suitable for potable supply after advanced treatment at defined abstraction points, and
2. Suitable for agricultural uses, and
3. Capable of supporting reasonably good coarse fisheries, and
4. Of moderate amenity value.

Class 3 - Poor quality waters

1. Suitable for low grade industrial use, and
2. Not anaerobic or likely to cause a nuisance, and

3. Capable of supporting a restricted aquatic flora and fauna.

N.B. Not required to be capable of supporting a viable fishery.

Class 4 - Bad quality waters

1. Likely to cause a nuisance.

2. Flora and fauna absent or restricted to pollution tolerant organisms.

Class X - Insignificant watercourses

1. Watercourses, not usable, and not placed in Classes 1A to 4 above.

2. Capable of supporting a restricted flora and fauna, and

3. Not likely to cause a nuisance.

APPENDIX III E.C. WATER QUALITY
CRITERIA FOR FISHERIES

LIST OF DETERMINANDS

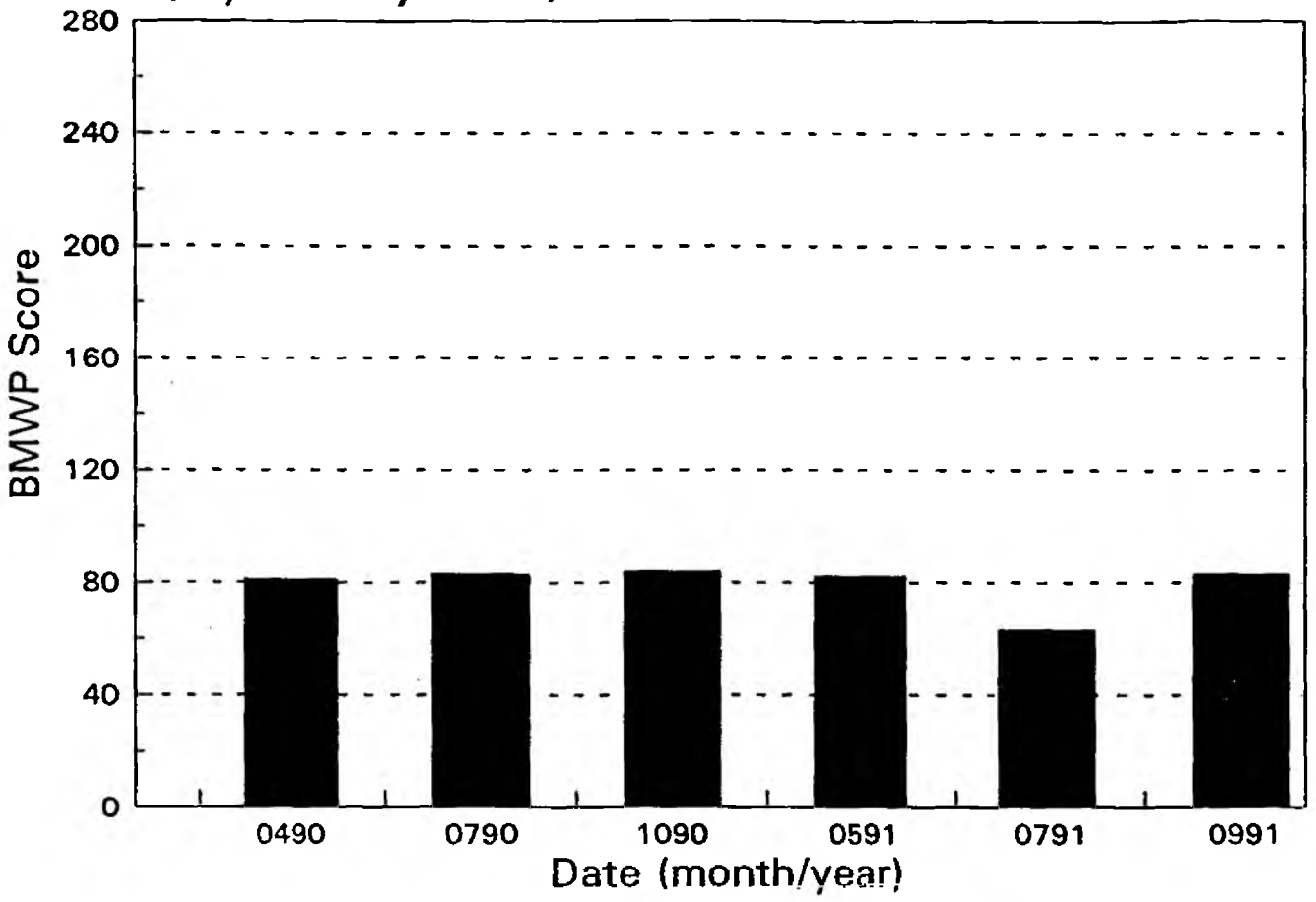
Determinand	*Salmonid Waters*		*Cyprinid Waters*	
	G	*I*	*G*	*I*
(a) Temperature (max) (b) Temperature rise		⩽ 21.5°C ⩾ 1.5°C		⩽ 28°C ⩾ 3°C
Dissolved oxygen (mg/l O_2)	50% ⩾ 9 100% ⩾ 7	50% ⩾ 9	50% ⩾ 8 100% ⩾ 5	50% ⩾ 7
pH		6--9		6–9
Suspended solids (mg/l)	⩽ 25		⩽ 25	
B.O.D. (A.T.U.) (mg/l)	⩽ 5*		⩽ 8*	
Nitrites (mg/l)	⩽ 0.2*		⩽ 0.5*	
Non-ionized ammonia (mg/l)	⩽ 0.005	⩽ 0.025	⩽ 0.005	⩽ 0.025
Total ammonium (mg/l NH_4)	⩽ 0.04	⩽ 1	⩽ 0.2	⩽ 1
Total residual chlorine (mg/l HC10)		⩽ 0.005		⩽ 0.005
Zinc (mg/l)		⩽ 0.3		⩽ 1
Copper (mg/l)	⩽ 0.04		⩽ 0.04	

** The revised G-values that have been set by the U.K. government*

APPENDIX IV

(1) Biological Monitoring

GUC (Aylesbury Arm) at Aston Clinton



(2)Water Quality Results

Period	RQO	Class Achieved
April 1991 to March 1992	2A	2A
January 1991 to December 1991	2A	3
October 1990 to September 1991	2A	3

APPENDIX V FISH INTRODUCTIONS CONSENTED Aug'87 TO Aug'92
(Chronological order with most recent first)

Date of issue	Applicant	Weight or Numbers	Species
22/10/90	Tring A.C.	60kg	roach and rudd
16/1/90	Midland Coarse Fish Supply	1000lbs	mixed
5/12/89	Midland C.F.S.	500kg	chub and dace
20/3/89	Tring A.C.	10000 @ 2"	roach and bream

FISH STOCKED BY NRA FISHERIES AUG'87 TO NOV'92

Date	Weight of fish	Species	Site of introduction
20/11/92	8.3kg	chub	Marsworth
20/11/92	8.3kg	chub	Dixons gap
2/6/92	25kg	mixed	Dixons Gap
29/4/92	20kg	mixed	Marsworth (T2)
14/2/92	100kg	mixed	Red House Pound (T1)
14/2/92	240kg	carp	Red House Pound (T1)
12/2/92	150kg	mixed	Wilstone (2 pounds) (T1)
12/2/92	35kg	carp	Downstream of lock 15 (T1)
12/2/92	15kg	carp	Red House Pound (T1)
11/2/92	110kg	mixed	Wilstone (2 pounds) (T1)
11/2/92	80kg	carp	Red House Pound (T1)
10/2/92	50kg	mixed	Wilstone (T1)
10/2/92	45kg	mixed	Marsworth (T1)
10/2/92	115kg	carp	Red House Pound (T1)
10/2/92	40kg	carp	Pound above lock 13 (T1)
12/12/90	130kg	bream	Red House Pound and pound above lock 13

T1 = Fish transferred from the fish rescue in the Oakfield Pound. The pound was dewatered to carry out work to the Bear Brook syphon.

T2 = Fish transferred from a cull on the Aylesbury Basin. (Joint operation with British Waterways).

In addition to the above, there has been a number of stockings to the main Grand Union Canal at or near Marsworth where the Aylesbury Arm branches off.

APPENDIX VI FISH MORTALITIES Aug'87 TO Aug'92

Date	Species	Approx Numbers	Approx Weight	Reason
1/7/92	mixed	35	5kg	Low dissolved oxygen levels emergency aeration deployed
29/4/92	mixed	20	2kg	possible spawning stress

APPENDIX VII. FISH HEALTH EXAMINATION (SUMMARY)

EXAMINATION REF: WYF(SURV)002

DATE RECEIVED: 26 NOVEMBER 1992
DATE COMPLETED: 16 DECEMBER 1992

EXAMINATION TITLE: GRAND UNION CANAL, AYLESBURY ARM

NATIONAL GRID REF: SP 868 140

REASON FOR EXAMINATION: FISHERIES SURVEY

GENERAL COMMENTS

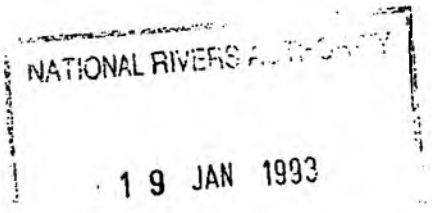
With the possible exception of *Eimeria sp.*?, all of the parasites encountered are found commonly on the host species submitted. There was no evidence of any parasites contained in the NRA "hit list".

CONCLUSION

No parasitological problems with the fish submitted.

William E. Yeomans.

WILLIAM E YEOMANS
BIOLOGIST



EXAMINATION DETAILS

EXAMINATION REF: WYF(SURV)002

FISH SPECIES	LENGTH RANGE (cm)	WEIGHT RANGE (g)	AGE RANGE	SEX
Bream	25.3	283.8	3+	Male
Gudgeon	10.3	13.6	2+	Male
Perch	12.2 - 15.2	28.5 - 56.7	(2+)-(3+)	Female
Pike	23.5 - 41.5	103.4 - 548.4	(2+)-(3+)	Male
Roach	7.1 - 18.2	5.6 - 123.2	(2+)-(4+)	Male Female

PARASITES PRESENT:

FISH SPECIES	NO EXAMINED	PARASITE	LOCATION	PREVALENCE (PERCENTAGE INFESTATION)	INTENSITY (DEGREE OF INFESTATION)
Bream	1	*Myxobolus sp*	Gills	Present	Light
		Diplozoon sp	Gills	Present	Light
		Diplostomum sp	Lens	Present	Light
Gudgeon	1	*Eimeria sp?*	Kidney/ Spleen	Present	Light
		Diplostomum sp	Lens	Present	Light
		Caryophyllaeides fennica	Gut	Present	Light
Perch	5	*Diplostomum sp*	Lens	80	Light
		Bunodera luciopercae	Gut	40	Light
		Triaenophorus nodulosus	Encysted on liver	40	Light/Heavy
		Camallanus lacustris	Gut	80	Light/Moderate
		Glochidia	Encysted on Gills	20	Light
Pike	4	*Myxobolus sp*	Encysted on Gills	25	Light
		Diplostomum sp	Lens	50	Light
Roach	15	*Myxidium sp*	Kidney	Present	Light
		Diplostomum sp	Lens	93.3	Light
		Tylodelphys clavata	Vitreous Humour	13.3	Light
		Philometra sp	Peritoneum	26.7	Light