SALMON PARR SURVEYS 1993-94

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CONTENTS

1 SUMMARY

A total of eight key sites on five nursery tributaries were surveyed by electrofishing between October 1993 and January 1994.

The surveys were undertaken in order to assess the performance of salmon parr and fry stocked during spring 1993.

Survival densities of parr were variable both within and between tributaries, however performance was generally quite good with densities ranging from 0.007m^{-2} to 0.083m^{-2} and survival estimates of 1.9 to 15.7%.

The best overall parr performance occurred in the River Chess with a mean survival density of 0.065m^{-2} (12.2% survival). Brown trout recruitment had also continued to improve at the Mountwood site to levels comparable with those prior to the pollution problems in the River Chess during the 1980's. The improvements in juvenile salmonid performance during 1993 may be partly attributed to the increase in flows to above average levels in this year.

The River Lambourn also performed well with a mean survival density of 0.051m^{-2} (10.4% survival) which may also have been a reflection of the improved flows in 1993.

The key site on the North Wey showed a poor parr survival density of 0.007m^{-2} (1.9%) which was comparable with previous years.

The performance of salmon fry stocked into the Loddon and South Wey tributaries was also highly variable.

Fry survival at the key site at Lodge Farm (LOCA) in the upper Loddon was very encouraging with a density of 0.415m^{-2} (20.8% survival) being achieved, and brown trout recruitment also showed a good recovery following the pollution problems of the previous year. Salmon fry growth rates were good with approximately half of the fish expected to migrate to sea as S1 smolts in spring 1994, and the remainder as S2 smolts in spring 1995.

Fry performance in the South Wey was very disappointing with survival rates lower than those normally achieved by parr. The mean survival density for the river was 0.045m^{-2} giving a survival rate of 1.9%. The key site at Hatch Farm (WSHG) which generally surpasses all other key sites produced extremely poor results, with a salmon fry survival rate of only 1.5%.

A review of long-term performance of all of the stocked nursery streams is planned to be produced during 1994.

2 INTRODUCTION

Each year, as part of the Thames Salmon Rehabilitation Scheme, up to 130,000 salmon parr are stocked into selected tributaries of the River Thames. The stocked areas are chosen according to their habitat, water quality and accessibility.

Following stocking, the parr compete for food and territories until the following spring when they become smolts and migrate to sea.

Electrofishing surveys of key sites on each river are carried out each year during the winter months in order to assess the performance of the parr since stocking. Many factors can affect the growth and survival of the parr over this time including the condition of the fish at stocking, source of fish, flows, water quality, temperature, food availability and habitat quality.

In spring 1993, 28,327 salmon parr and 53,825 salmon fry were stocked into five Thames tributaries (Appendix I). The fry were obtained following a reduction in the number of parr available for stocking due to an outbreak of furunculosis at Clearwell fish farm where a significant proportion of parr were being reared.

Sources of parr which were stocked included Thames origin and Test origin parr which had been moved from the fish farm prior to the outbreak of furunculosis, and fish purchased/donated by Lovat Fisheries. These fish were stocked into the River Chess, North Wey and Lambourn. The fry were of commercial Scottish origin and purchased from Wester Ross Fisheries. The fry were stocked into the South Wey and the upper part of the River Loddon.

Eight electrofishing surveys were undertaken at key sites on all of the stocked nursery streams between October 1993 and January 1994.

This report presents and discusses the results of these surveys.

3 METHODS

A total of eight electrofishing key sites were surveyed quantitatively on five stocked nursery streams between October 1993 and February 1994 (Appendix II).

Each site was approximately 100m in length and enclosed with a stopnet at each end. Three electrofishing runs were performed at each site to give a good catch depletion using pulsed DC equipment.

Details of each fish, including species, fork length and weight were recorded on the Husky Hunter data logger along with presence of minor species, physical measurements and habitat details.

All data was downloaded and processed using the Fisheries Information System (FINS) and graphics were then produced using Freelance Plus.

Water quality, biotic class and flow data was also assessed for each river.

One key site at Moor Bridge Farm (LAAF) on the River Lambourn was also assesed using HABSCORE, a system for quantifying habitat quality, as part of a National R&D Project.

4.2 RIVER LODDON SURVEY

Survey Site	Site Code	NGR	Stocking Density m^{-2}
Lodge Farm	LOCA	SU 673543	0.6

Introduction

a) Stocking Details

One kilometre of the River Loddon, running through Lodge Farm, was stocked in May 1993 with 10,000 0.8g commercial Scottish origin salmon fry at a density of $2.0m^{-2}$.

b) Survey Details

A key site at Lodge Farm (LOCA) was electrofished quantitatively during October 1993.

c) Flows (fig 4.2a)

During 1993 flows in the River Loddon at Sheepbridge fluctuated above and below the long term mean throughout the year. In the months of January, April, October and December high rainfall and surface run-off resulted in above average flows in the Loddon. Apart from these months, flows were below the long-term mean from February to March, (remaining at approximately 2 cumecs) and slightly above it until September.

d) Water Quality

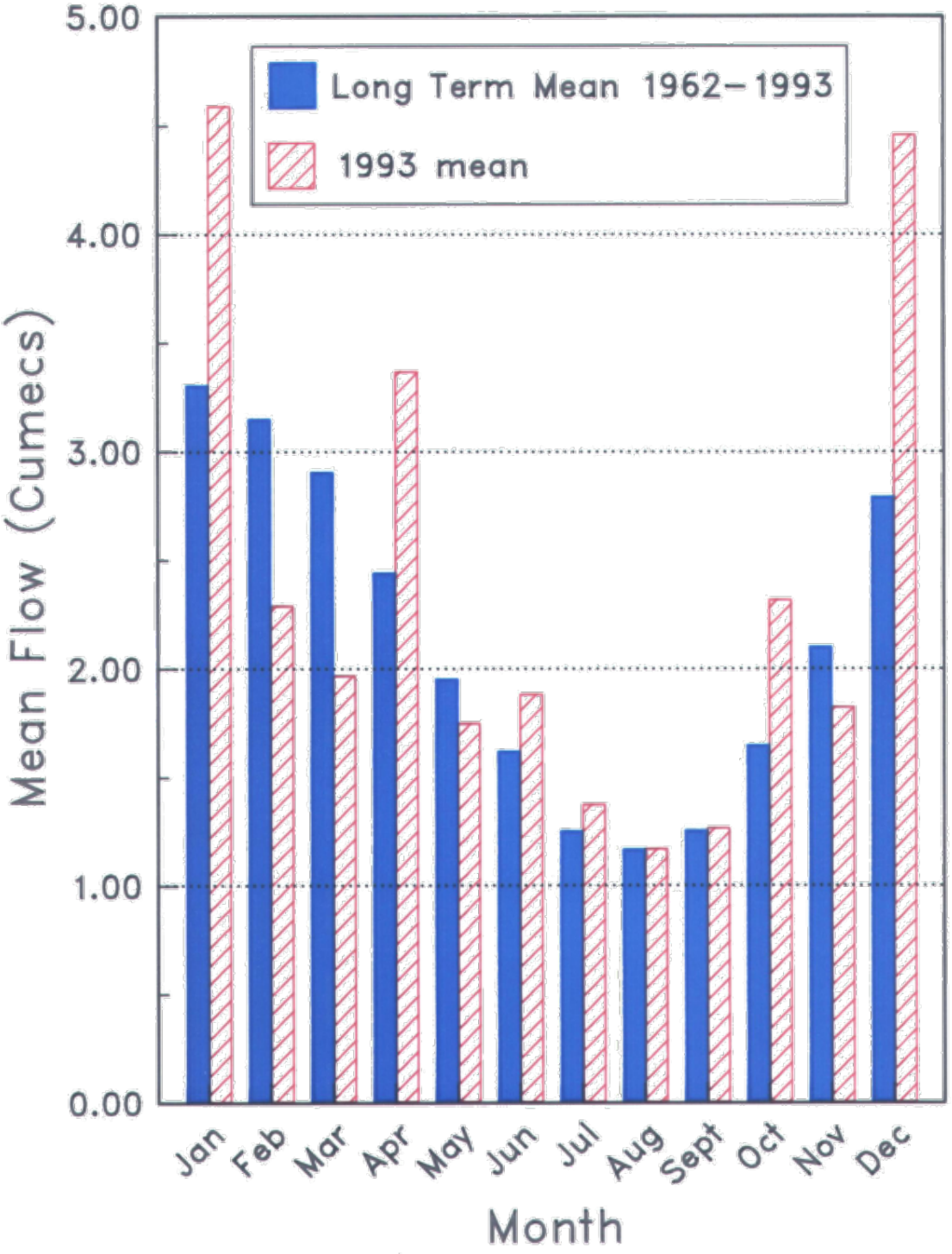
Up until the time of the survey in October this section of the River Loddon exceeded its Water Quality Objective of 1B by achieving a class of 1A.

e) Biotic Class

This section of river obtained a biotic class of B thus indicating a reasonable water quality.

Fig 4.2a

River Loddon Flow Data
Monthly Mean Flows AT Sheepbridge



SITE REPORT

WATERCOURSE : River Loddon
SITE NAME : Lodge Farm
SITE CODE : LOCA
NGR : SU 673543
DATE SAMPLED: 20.10.93

BIOTIC CLASS: B
RQO: 1B (1A Achieved prior to survey)
EC DESIGNATED FISHERY: Salmonid

LAND OWNERSHIP : Mr Marks, Blacklands Farm
ANGLING INTEREST: Dr A Gibberd

LENGTH: 102m **MEAN WIDTH** : 5.2m **AREA:** 530m^2 **MEAN DEPTH:** 55cm
TEMP : 13°c **CONDUCTIVITY:** 694us **POPULATION METHOD:** CR

SUBSTRATE COMPOSITION (%)
BARE: 0 MUD & SILT: 5 GRAVEL: 90 STONES: 5 BOULDERS: 0

WEED COVER (%)
EMERGENT: 40 FLOATING: 0 SUBMERGED: 30 SHADE: 5

FLOWS AT TIME OF SURVEY: Low & Clear

HABITAT QUALITY:

The habitat at this site appeared to be well suited for juvenile salmonids with a good mix of riffles, glides and pools, and a predominantly gravel substrate.

Good cover was provided by both instream vegetation (Ranunculus, Callitriche, Rorippa), and bankside cover (tree roots, undercut banks and emergent plants including Rorippa, Apium, Veronica).

SURVEY RESULTS: (figs 4.2b, 4.2c)

211 salmon were caught during this survey giving an excellent survival density of 0.415m^{-2} and a biomass of 4.1gm^{-2} since stocking (20.8% survival). These salmon had grown fairly well to an average weight of 9.8g since being stocked as fry at 0.8g in May 1993.

The brown trout population was also good with 118 fish being captured giving a density of 0.228m^{-2} and a biomass of 21.6gm^{-2}. Of these fish, a large proportion were 0+ fish which was encouraging since the section had been virtually absent of any fish species the previous year following a pollution incident. Some of the larger brown trout appeared to be stocked fish.

11 Rainbow trout giving a density of $0.021m^{-2}$ were also caught in the section. These were thought to be escapees from an upstream fish farm. Minor fish species were represented by bullheads, stickleback and lampreys.

The total fish biomass of $29.0gm^{-2}$ easily achieved the target biomass of $15.0gm^{-2}$ for an EC designated salmonid fishery.

FP65 Biomass, Density and Population for Species 22/06/92

SITE LOCA SURVEY: E0062 salmon parr survey DATE: 20/10/93

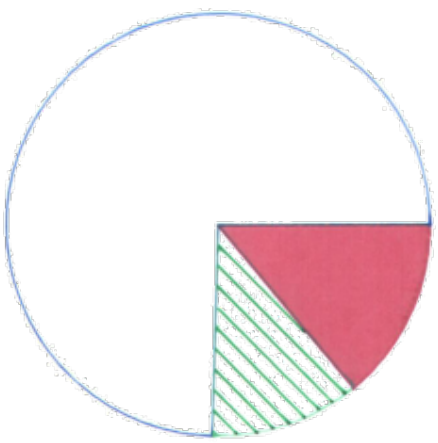
Species		Cutoff cm	Prob p	Biomass g/sqm	Density n/sqm	Density Upp	Density Low	Population Est	Population Upp	Population Low
BROWN TROUT										
Carle&Strube	>	1.0	0.70	21.597	0.228	0.236	0.223	121	125	118
Minimum Estimate	<=	1.0		0.000	0.000			0		
RAINBOW TROUT										
Minimum Estimate	>	1.0	0.00	3.331	0.021	0.000	0.000	11	0	0
Minimum Estimate	<=	1.0		0.000	0.000			0		
SALMON										
Carle&Strube	>	1.0	0.64	4.068	0.415	0.432	0.398	220	229	211
Minimum Estimate	<=	1.0		0.000	0.000			0		

Total biomass = 28.996 g/sqm Total density = 0.664 n/sqm

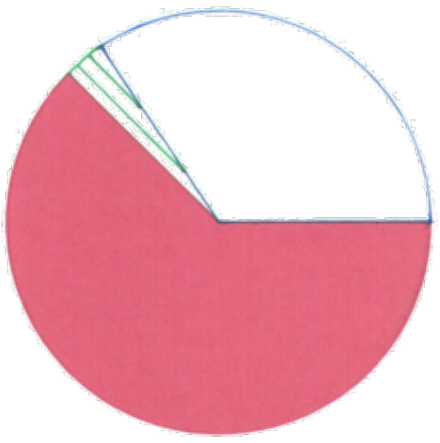
Fig 4.2b

River Loddon 1993–1994
Site LOCA Lodge Farm
Biomass And Density

	Biomass (gm-2)	Density (nm-2)
Brown Trout	21.6	0.228
Rainbow Trout	3.3	0.021
Salmon	4.1	0.415
Total	29.0	0.664



Biomass

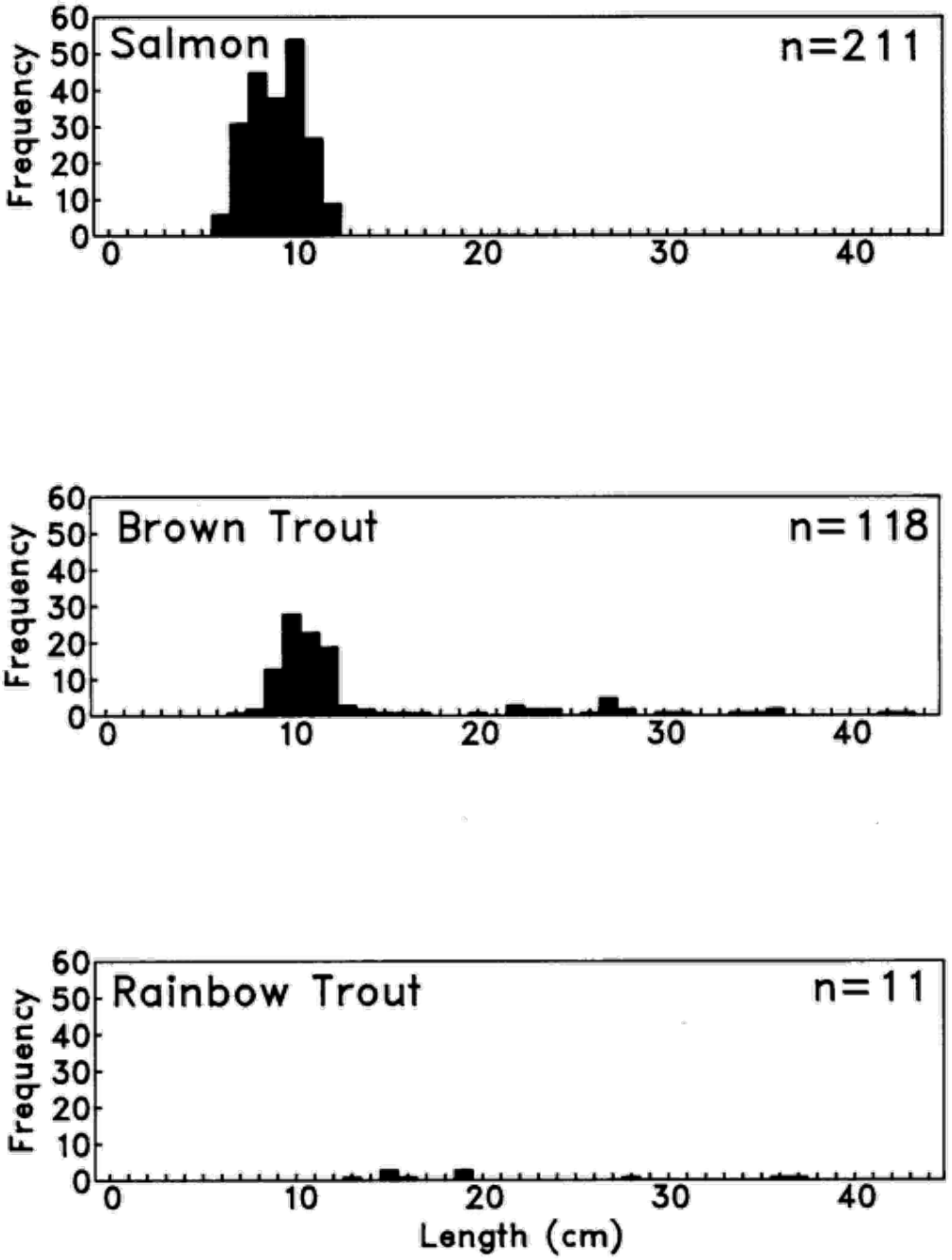


Density

Fig 4.2c

River Loddon 1993–1994

Site LOCA Lodge Farm Length Frequency



DISCUSSION - RIVER LODDON

In spring 1993 the upper section of the River Loddon which included the survey site at Lodge Farm was stocked with 10,000 salmon fry (mean weight 0.8g) at a density of $2.0m^{-2}$.

The electrofishing survey performed in October 1993 indicated that survival rates were good (20.8%) with a density of $0.415m^{-2}$ being achieved. Growth rates were also quite good (0.073g/day) and it was estimated that approximately half of the fry would become S1 smolts by March 1994 and the remainder would reside in the river for another year as parr before migrating to sea as S2 solts in spring 1995.

The population density of brown trout in 1993 was also encouraging with a density of $0.228m^{-2}$ being achieved. The majority of these were 0+ brown trout which were probably derived from natural recruitment, but may have included escapees from the trout farm upstream. Future surveys will determine of the 0+ class is evident in 1995. Therefore this showed a good recovery of fish populations since the previous year's survey when the section was found to be almost devoid of fish. This was thought to have been due to a short-term acute water quality problem not detected in routine monitoring samples. The total fish biomass of $29.0gm^{-2}$ now easily exceeded the target biomass of $15.0gm^{-2}$ for an EC designated salmonid fishery, however the majority of this biomass was represented by the larger brown trout specimens, some of which had been stocked, and by a few escapee rainbow trout from the upstream fish farm.

The improvement in flows on the River Loddon during 1993, which were higher than the long term mean in all but three months of the year have probably also helped to increase the survival rates of juvenile salmonids in the river. Therefore with good flow rates, and an absence of water quality problems this section of river has been shown to be well suited to juvenile salmonid survival.

The survival rate of 20.8% for the salmon fry gave a population estimate of 2080 fish throughout the stocked section of the River Loddon, with approximately half of these expected to migrate as S1 smolts in spring 1994.

GENERAL DISCUSSION

The results for the 1993 parr and fry surveys again showed that survival densities were fairly variable both within and between tributaries, and compared with previous years (Appendices II & III).

Of the three tributaries stocked with parr, the River Chess showed the best overall performance, with a mean survival density of $0.065m^{-2}$ for the two key sites (12.2% survival). The key site at Latimer Island (CHNB) had the highest survival density of $0.083m^{-2}$ (15.7% survival), and a second site at Mountwood (CHEB) also showed improvement since the previous year with a density of $0.046m^{-2}$ being achieved (compared with $0.012m^{-2}$ in 1992).

Growth rates of salmon parr in the Chess of up to 0.25g/day at Mountwood were very good, exceeding even those observed in the River Test for fry (0.106g/day).

The increase in parr survival in the River Chess during 1993 may be partly attributed to the improved condition of the fish prior to stocking compared with the previous year, and is probably also related to the significant improvement in flows to above average levels for the first time in four years.

Brown trout recruitment at Mountwood also continued to increase steadily in 1993, achieving a population density of $0.159m^{-2}$ which was comparable with densities recorded prior to the pollution problems of the mid-1980's. Therefore in the absence of water quality problems, it is clear that the habitat and biological quality of the river are capable of supporting good populations of juvenile salmonids.

The River Lambourn which was stocked with batchmarked Thames origin parr also peformed quite well at both key sites with a mean density of $0.051m^{-2}$ (10.4% survival) being achieved. The improvement on the previous years parr suvival may again be related to improved flows in the River Lambourn during 1993 to above average levels following the previous run of low flow years.

The increase in juvenile salmonid densities at the key site at Dreweatt-Neate may be partly attributed to the reduction in pike density.

Parr stocked into the section including the key site at Moor Bridge farm, had been microtagged and adipose fin clipped prior to stocking and were checked for tag retention during the survey. A loss rate of 12.5% had occurred which may have significant implications for batch mark return estimates.

Survival of salmon parr stocked into the North Wey was poor with a density of only $0.007m^{-2}$ (1.9% survival) being achieved. This is comparable with results of previous years. Juvenile salmonid survival may be suppressed by the habitat quality of the section which may be more suitable for coarse fish species.

The Rivers Loddon and South Wey which were stocked with fry of Commercial Scottish Origin also showed highly variable survival rates at key sites.

The site at Lodge Farm (LOCA) in the upper Loddon which was stocked at a density of 2.0m^{-2} showed an excellent survival density of 0.415m^{-2} (20.8% survival).

Brown trout recruitment had also shown a good recovery since the previous year when it was probable that an undetected pollution incident had killed virtually all the fish in the section. This was encouraging since it showed that reasonable densities of salmon and brown trout fry could co-exist in such a section with good quality habitat and a plentiful food supply. However, problems could occur if one of these factors became limiting (Chapman 1966).

The salmon fry also showed good growth rates at this site (0.073g/day) with approximately half of the fry expected to become S1 smolts in 1994, and the remainder S2 smolts in 1995.

In contrast the fry survival and growth at sites in the South Wey was very disappointing with a mean survival density of only 0.045m^{-2} (1.9% survival). Survival at the key site at Hatch Farm (WSHG) was especially poor (1.5%) since this site traditionally performs very well for parr, and fry survival densities would have been expected to be even higher. Growth rates were also slow in the South Wey (0.039-0.042g/day) compared with other Southern rivers (eg. 0.016g/day in the River Test) and it was estimated that the majority would become S2 smolts.

Brown trout recruitment was also observed to have decreased since the previous year at Hatch farm, the reason for this being unclear. It was possible that the results for this site were misleading, since the survey was performed under flow conditions which were faster than desirable and there was a chance that small 0+ fish may have been missed.

With the exception of the South and North Wey the performance of stocked juvenile salmon in 1993 was quite good. It is still planned to produce a review of the long term performance of the stocked nursery streams in relation to stocking densities and other factors affecting the carrying capacity during 1994.

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SRS Internal Report

APPENDIX 1

Salmon Parr/Fry Stocking Sites - 1993

Date	River	Map Reference	Number	Density	Mean Wt/g	Source Mark	Batch
1. PARR							
15/16-02-93	Lambourn	SU419723-SU427723	3,020	$0.34m^{-2}$	10.13	Thames/Wye/Avon/OB	AC+CWT
		SU427723-SU427715	3,432	$0.34m^{-2}$	10.13	Thames/Wye/Avon/OB	AC+CWT
		SU427715-SU429707	6,057	$0.64m^{-2}$	10.13	Thames/Wye/Avon/OB	AC+CWT
10-03-93	Lambourn	SU466686-SU470683	2,100	$0.53m^{-2}$	9.0	Thames/Wye/Avon/OB/QEII	AC
		TOTAL:	14,609				
02-03-93	North Wey	SU865446-SU869445	1,760	$0.36m^{-2}$	10.0	Test/OB/QEII	-
		SU869445-SU874435	3,240	$0.36m^{-2}$	10.0	Test/OB/QEII	-
		TOTAL:	5,000				
11-03-93	Chess	SU987994-SU996987	2,110	$0.53m^{-2}$	9.1	Lovat/QEII	-
		SU999987-TQ008987	2,739	$0.53m^{-2}$	9.1	Lovat/QEII	-
		TQ015988-TQ028989	3,869	$0.53m^{-2}$	9.1	Lovat/QEII	-
		TOTAL:	8,718				
		TOTAL NUMBER OF PARR STOCKED = 28,327					
2. FRY							
18-05-93	South Wey	SU843323-SU837333	18,412	$2.6m^{-2}$	0.8	Commercial Scottish Origin	-
		SU873333-SU827338	14,163	$2.6m^{-2}$	0.8	"	-
		SU823341-SU817348	11,250	$2.0m^{-2}$	0.8	"	-
		TOTAL:	43,825				
28-05-93	Loddon	SU672543-SU677548	10,000	$2.0m^{-2}$	0.8	"	-
		TOTAL NUMBER OF FRY STOCKED = 53,825					

Key:

AC = Adipose fin clip
CWT = Coded wire tag

APPENDIX II

Salmon Survey Sites 1993

River	Date	Site Name	Map Reference	Site Code
River Lambourn	27-10-93	Moor Bridge Farm	SU429710	LAAF
	28-10-93	Dreweatt-Neate	SU466685	LAAH
River Chess	21-10-93	Latimer Island	TQ001987	CHNB
	21-10-93	Mountwood	TQ025989	CHEB
River Wey(North)	21-01-94	Tilfordmill Bridge	SU869444	WNEC
River Wey(South)	21-10-93	Heronwater	SU839328	WSHE
	23-11-93	Hatch Farm	SU817346	WSHG
River Loddon	20-10-93	Lodge Farm	SU673543	LOCA

APPENDIX III

Fry/Parr Survival Summary 1993

STOCKING DETAILS					SURVEY DETAILS					
River	Date Stocked	Number Stocked	Stocking Density	Source	Survey Site	Date Fished	Site Surivival Density	% Survival at site	Mean Density in River	Mean % Surivival in River
Parr										
Lambourn	15-16/2/93	12,509 (CWT+AC)	0.44	Thames/Wye/	LAAF	27-10-93	0.042	9.5	0.051	10.4
	10-03-93	2,100 (AC)	0.53	Avon/OB	LAAH	28-10-93	0.060	11.3		
North Wey	02-03-93	5,000	0.36	Test/OB/QEII	WNEC	21-01-94	0.007	1.9	0.007	1.9
Chess	11-03-93	8,718	0.53	Lovat/QEII	CHNB	21-10-93	0.083	15.7	0.065	
					CHEB	21-10-93	0.046	8.7		12.2
Fry										
Loddon	18-05-93	10,000	2.0	Commercial Scottish Origin	LOCA	20-10-93	0.415	20.8	0.415	20.8
South Wey	18-05-93	43,825	2.4	Commercial Scottish Origin	WSHE	21-10-93	0.060	2.3	0.045	1.9
					WSHG	23-11-93	0.029	1.5		

APPENDIX IV N.W.C. CLASSIFICATION OF RIVER QUALITY

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 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 1.5 mg/l (ii) Visible evidence of pollution should be absent	(i) Water of high quality suitable for potable supply abstraction and for all other abstractions (ii) 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 V 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 VI 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		$\leqslant$ 21.5°C $\geqslant$ 1.5°C		$\leqslant$ 28°C $\geqslant$ 3°C
Dissolved oxygen (mg/l O_2)	50% $\geqslant$ 9 100% $\geqslant$ 7	50% $\geqslant$ 9	50% $\geqslant$ 8 100% $\geqslant$ 5	50% $\geqslant$ 7
pH		6--9		6--9
Suspended solids (mg/l)	$\leqslant$ 25		$\leqslant$ 25	
B.O.D. (A.T.U.) (mg/l)	$\leqslant$ 5*		$\leqslant$ 8*	
Nitrites (mg/l)	$\leqslant$ 0.2*		$\leqslant$ 0.5*	
Non-ionized ammonia (mg/l)	$\leqslant$ 0.005	$\leqslant$ 0.025	$\leqslant$ 0.005	$\leqslant$ 0.025
Total ammonium (mg/l NH_4)	$\leqslant$ 0.04	$\leqslant$ 1	$\leqslant$ 0.2	$\leqslant$ 1
Total residual chlorine (mg/l HC10)		$\leqslant$ 0.005		$\leqslant$ 0.005
Zinc (mg/l)		$\leqslant$ 0.3		$\leqslant$ 1
Copper (mg/l)	$\leqslant$ 0.04		$\leqslant$ 0.04	

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