SALMON PARR SURVEYS 1991-92

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INTRODUCTION

As part of the Salmon Rehabilitation Scheme, up to 130,000 salmon parr are stocked into selected River Thames tributaries during the spring months.

The parr remain in these rivers establishing territories for themselves and feeding until the following year when they become smolts and migrate to sea.

The survival and growth rates of the stocked parr during that year are dependant upon many factors. Some of these include; river flows, temperature, water quality, cover and food availability during the year, plus the source and condition of the fish at stocking. Therefore, in order to assess parr performance, electrofishing surveys of the stocked nursery streams are performed at key sites during the winter.

Previous surveys have confirmed that the parr stocking to the tributaries is effective, and little habitat degradation has occurred in spite of three years of low rainfall. On sections where surveys have identified a degradation in parr performance, stocking has in the past been terminated.

In spring 1991, a total of 80,000 parr originating from a number of sources were stocked into nine Thames tributaries. Sources included; Thames Returnee Progeny (produced by cross-breeding Thames adult returnees with other genetic sources of salmon in order to maximise number of offspring produced), and donations or purchases from Joseph Johnston, Avon Springs, Langstroth and Clearwell Fish Farms/Hatcheries.

The parr were trickle stocked within most sections in order that suitable territories spread over a large distance could be occupied immediately.

Spot stocking was performed on one section of the upper Lambourn, however it is unclear whether parr can disperse themselves effectively using this stocking method.

Between October 1991 and January 1992, thirteen electrofishing surveys were undertaken on seven of the stocked nursery streams. This report will present and discuss the results of the 1991-1992 surveys.

SUMMARY

A total of thirteen key sites on seven nursery tributaries were surveyed by electrofishing between October 1991 and January 1992.

The aim of the surveys was to assess the performance of salmon parr stocked in spring 1991.

The results varied significantly both between and within tributaries, with survival densities in the range of 0.0 to 0.090 parr m^{-2} and survival estimates of 0 to 25%.

The River Chess showed good results with the usual key sites having a mean survival of 17%. The results are particularly encouraging given low base flows and reflect the improvement in water quality.

The two sites at Chennies were assessed to monitor a habitat enhancement project undertaken in 1982. The disappointing results with survival of approximately 1% were mainly due to low flow and associated effects on habitat.

The River Lambourn performed well with survival of 12%. It would again appear that low base flows had no significant effect on salmon parr performance.

The performance of the River Kennet is difficult to assess due to the semi-quantitative nature of the surveys. Survey results indicate performance to be poor (survival 3%) but these represent underestimates.

The River Wey (South) remains one of the best nursery areas in the lower catchment with survival as high as 18% and good densities being recorded.

The performance of the River Loddon gives cause for concern with very poor results being obtained this year (survival 0.2%). A further assessment of stocking on this tributary will be made in the near future.

The results of the Rivers Enborne and Lyde survey indicate performance to be poor.

It is intended to produce a short report reviewing all aspects of the stocking programme during the winter 1992/93.

SITE REPORT

WATERCOURSE : River Loddon
SITE NAME : Lillymill Ford
SITE CODE : LOE6 (LOEB)
N.G.R : SU684595
DATE SAMPLED: 5.11.91

LAND OWNERSHIP : Duke of Wellington
ANGLING INTEREST: Steve Penney

LENGTH: 100m **MEAN WIDTH** : 10.0m **AREA**: 1000m^2
TEMP : 4°C **CONDUCTIVITY**:

COMMENTS: The River Loddon was stocked with 10,743 Thames/Kielder origin parr at a density of 0.64m^{-2} in February 1991. This site was surveyed in November 1991 and results were very disappointing since no salmon were caught.

Previous surveys at this site have also revealed poor salmon survival densities which have fallen from a maximum of 0.017m^{-2} in 1988 to 0.004m^{-2} in 1990. Brown trout recruitment has also been negligable during the last three years surveys even though the stocking rate is high in order to maintain a put and take trout fishery.

The reason for the poor salmon parr survival and low brown trout recruitment is unclear since the chemical and biological quality of the section was good (class 1B).

The habitat quality of the site, however, was not particularly suitable for juvenile salmonids since there were many deep, slow flowing silty sections but limited areas of riffle. Trout recruitment may also be limited by the low availability of suitable spawning gravels and nursery habitat.

Predation by the stocked brown trout could be another factor limiting the survival of salmon parr.

A report on the fishery sites throughout the Loddon is due to be published shortly and this will be examined in conjunction with the chemical and biological quality in order to try and identify the reasons for the poor salmon parr survival.

Other fish species present at this site inclued 21 chub, 100 dace, 28 roach plus gudgeon, minnow, eel and bullhead. The total biomass in 1991 had risen to 29.650gm^{-2} from 4.358gm^{-2} in 1990, and the density from 0.013m^{-2} in 1990 to 0.189m^{-2} in 1991. These increases were mainly due to a rise in numbers of chub and dace, and the appearance of roach and gudgeon since 1990.

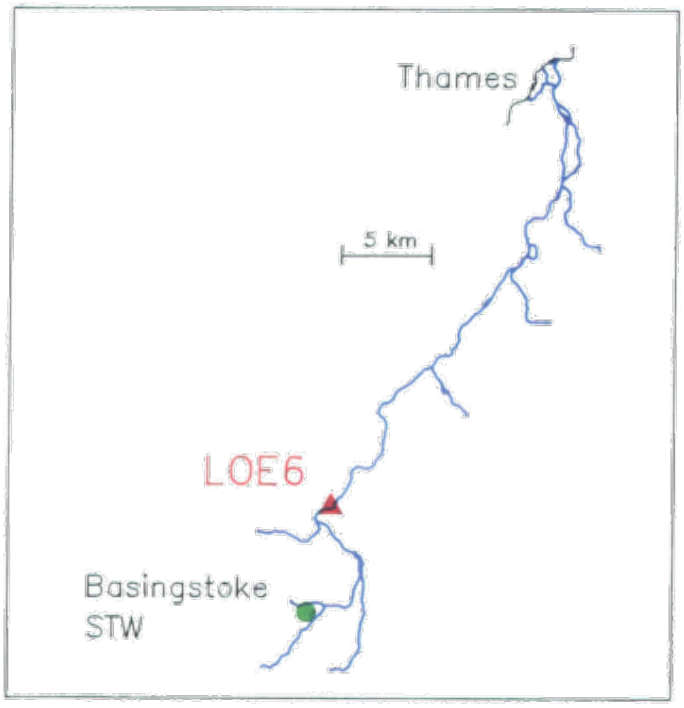
FP65 Biomass, Density and Population for Species 01/03/92

SITE LOE6 SURVEY: E0053 parr survey DATE: 05/11/91

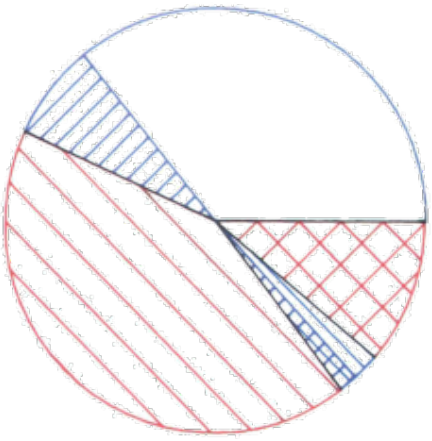
Species		Cutoff cm	Prob p	Biomass g/sqm	Density n/sqm	Upp	Low	Population Est	Upp	Low
BULLHEAD										
Present Only										
BROWN TROUT										
Seber&LeCren	>	1.0	0.80	10.657	0.019	0.022	0.018	19	22	18
Minimum Estimate	<=	1.0		0.000	0.000			0		
CHUB										
Seber&LeCren	>	1.0	0.89	2.150	0.021	0.022	0.021	21	22	21
Minimum Estimate	<=	1.0		0.000	0.000			0		
DACE										
Seber&LeCren	>	1.0	0.89	12.540	0.100	0.103	0.099	100	103	99
Minimum Estimate	<=	1.0		0.000	0.000			0		
EEL										
Seber&LeCren	>	1.0	1.00	0.415	0.001	0.001	0.001	1	1	1
Minimum Estimate	<=	1.0		0.000	0.000			0		
GUDGEON										
Seber&LeCren	>	1.0	0.73	0.614	0.020	0.024	0.019	20	24	19
Minimum Estimate	<=	1.0		0.000	0.000			0		
MINNOW										
Present Only										
ROACH										
Seber&LeCren	>	1.0	0.96	3.273	0.028	0.028	0.028	28	28	28
Minimum Estimate	<=	1.0		0.000	0.000			0		

Total biomass = 29.650 g/sqm Total density = 0.189 n/sqm

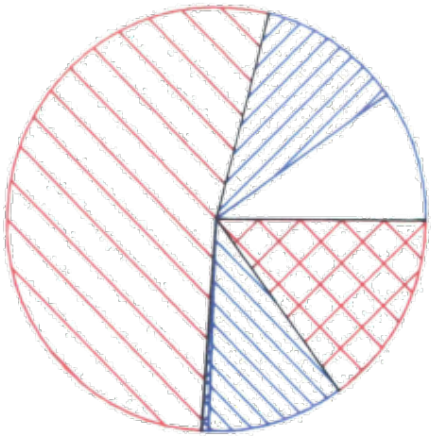
River Loddon 1991–1992
Site LOE6 Lillymill Ford
Biomass And Density



	Biomass (gm-2)	Density (nm-2)
Brown Trout	10.7	0.019
Chub	2.2	0.021
Dace	12.5	0.100
Eel	0.4	0.001
Gudgeon	0.6	0.020
Roach	3.3	0.028
TOTAL	29.6	0.189

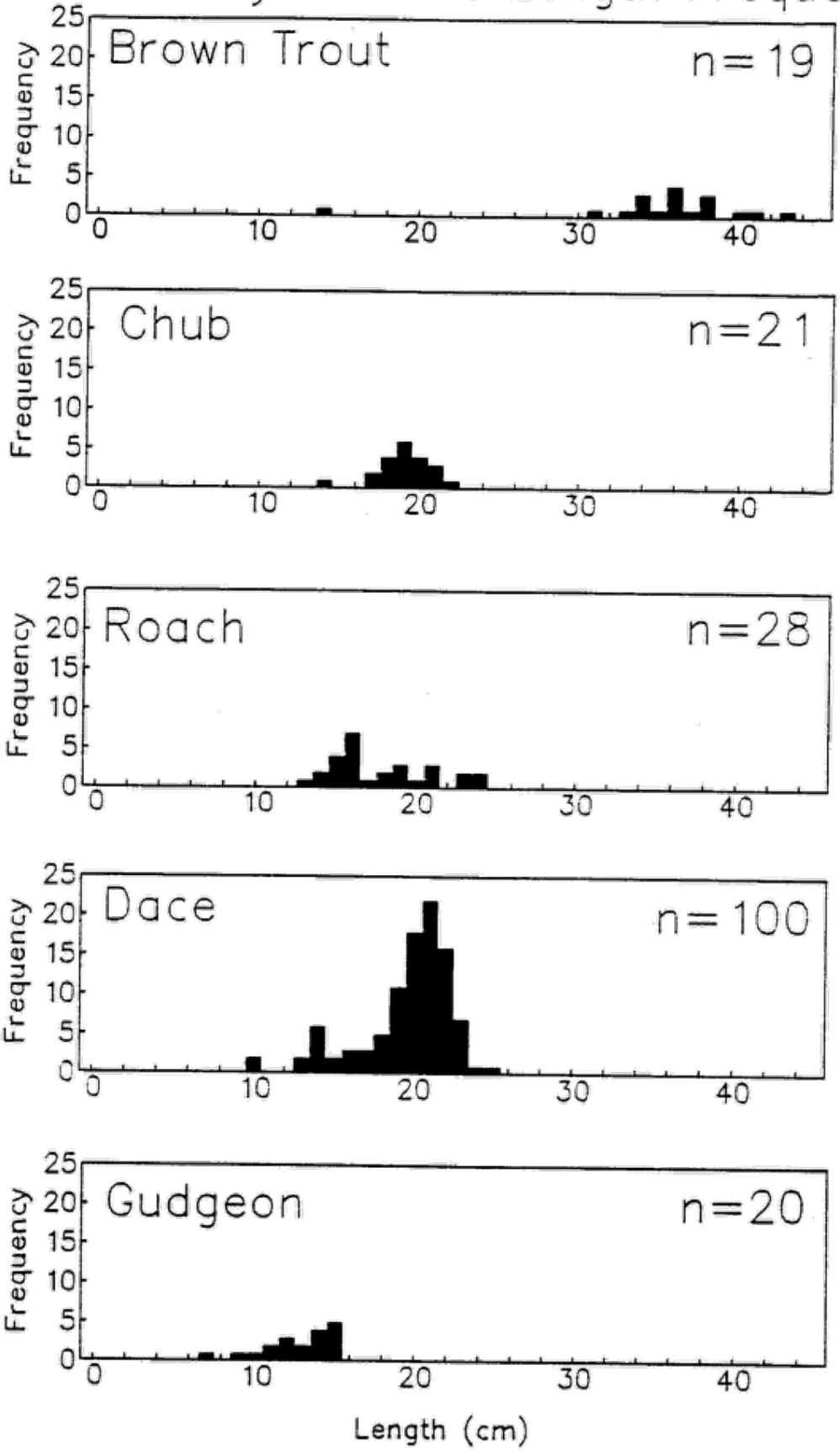


Biomass



Density

River Loddon 1991–1992
Site LOE6 Lillymill Ford Length Frequency



SITE REPORT

WATERCOURSE : River Loddon
SITE NAME : Upstream Bow Brook
SITE CODE : LOE7
N.G.R : SU681587
DATE SAMPLED: 5.11.91

LAND OWNERSHIP : Duke of Wellington
ANGLING INTEREST: Steve Penney

LENGTH: 89m **MEAN WIDTH** : 9.0m **AREA**: 801m^2
TEMP : 4°C **CONDUCTIVITY**:

COMMENTS: Two salmon and 19 brown trout were caught during the electrofishing survey at this site, which was approximately 1.5Km upstream of the Lillymill Ford site (LOE6) and had also been stocked at a density of 0.64m^{-2} with Thames/Kielder origin parr.

This resulted in a survival density of 0.003m^{-2} and a biomass of 0.089gm^{-2} for salmon parr which represented a survival rate for the stocked sections of the river was 0.235% giving a very poor population estimate of 25 salmon.

In constrast to the Lillymill Ford site, there was some brown trout recruitment of this site, however the coarse fish populations were similar at both sites.

The reason for the poor performance of the stocked salmon parr at this site is again unclear but may also be due to inferior habitat quality or predation by stocked brown trout. It will be looked at in more detail in the near future.

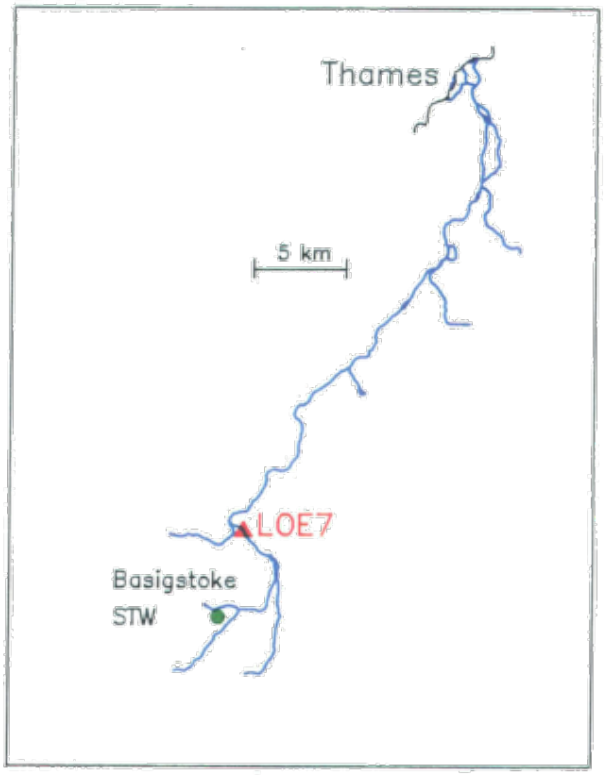
FP65 Biomass, Density and Population for Species 01/03/92

SITE LOE7 SURVEY: E0053 parr survey DATE: 05/11/91

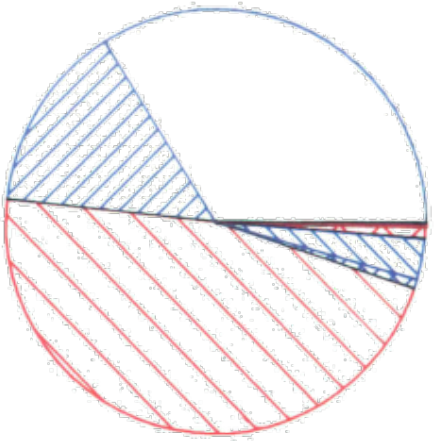
Species		Cutoff cm	Prob p	Biomass g/sqm	Density n/sqm	Upp	Low	Population Est	Upp	Low
BROWN TROUT										
Minimum Estimate	>	1.0	0.00	8.707	0.024	0.000	0.000	19	0	0
Minimum Estimate	<=	1.0		0.000	0.000			0		
CHUB										
Seber&LeCren	>	1.0	0.89	3.672	0.026	0.028	0.026	21	22	21
Minimum Estimate	<=	1.0		0.000	0.000			0		
DACE										
Seber&LeCren	>	1.0	0.98	11.909	0.084	0.084	0.084	67	67	67
Minimum Estimate	<=	1.0		0.000	0.000			0		
EEL										
Seber&LeCren	>	1.0	1.00	0.183	0.001	0.001	0.001	1	1	1
Minimum Estimate	<=	1.0		0.000	0.000			0		
GUDGEON										
Minimum Estimate	>	1.0	0.00	0.798	0.026	0.000	0.000	21	0	0
Minimum Estimate	<=	1.0		0.000	0.000			0		
ROACH										
Seber&LeCren	>	1.0	1.00	0.225	0.001	0.001	0.001	1	1	1
Minimum Estimate	<=	1.0		0.000	0.000			0		
SALMON										
Minimum Estimate	>	1.0	0.00	0.089	0.003	0.000	0.000	2	0	0
Minimum Estimate	<=	1.0		0.000	0.000			0		

Total biomass = 25.583 g/sqm Total density = 0.165 n/sqm

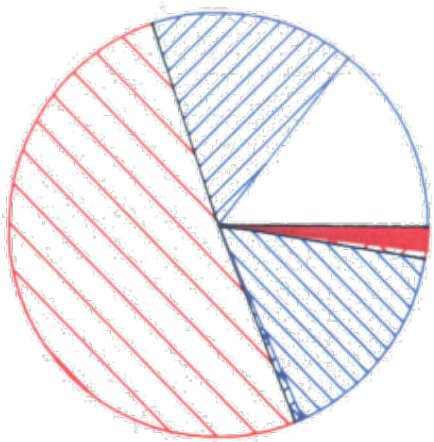
River Loddon 1991–1992
Site LOE7 U/S Bow Brook
Biomass And Density



	Biomass (gm−2)	Density (nm−2)
Brown Trout	8.7	0.024
Chub	3.7	0.026
Dace	11.9	0.084
Eel	0.2	0.001
Gudgeon	0.8	0.026
Roach	0.2	0.001
Salmon	0.1	0.003
TOTAL	25.6	0.165

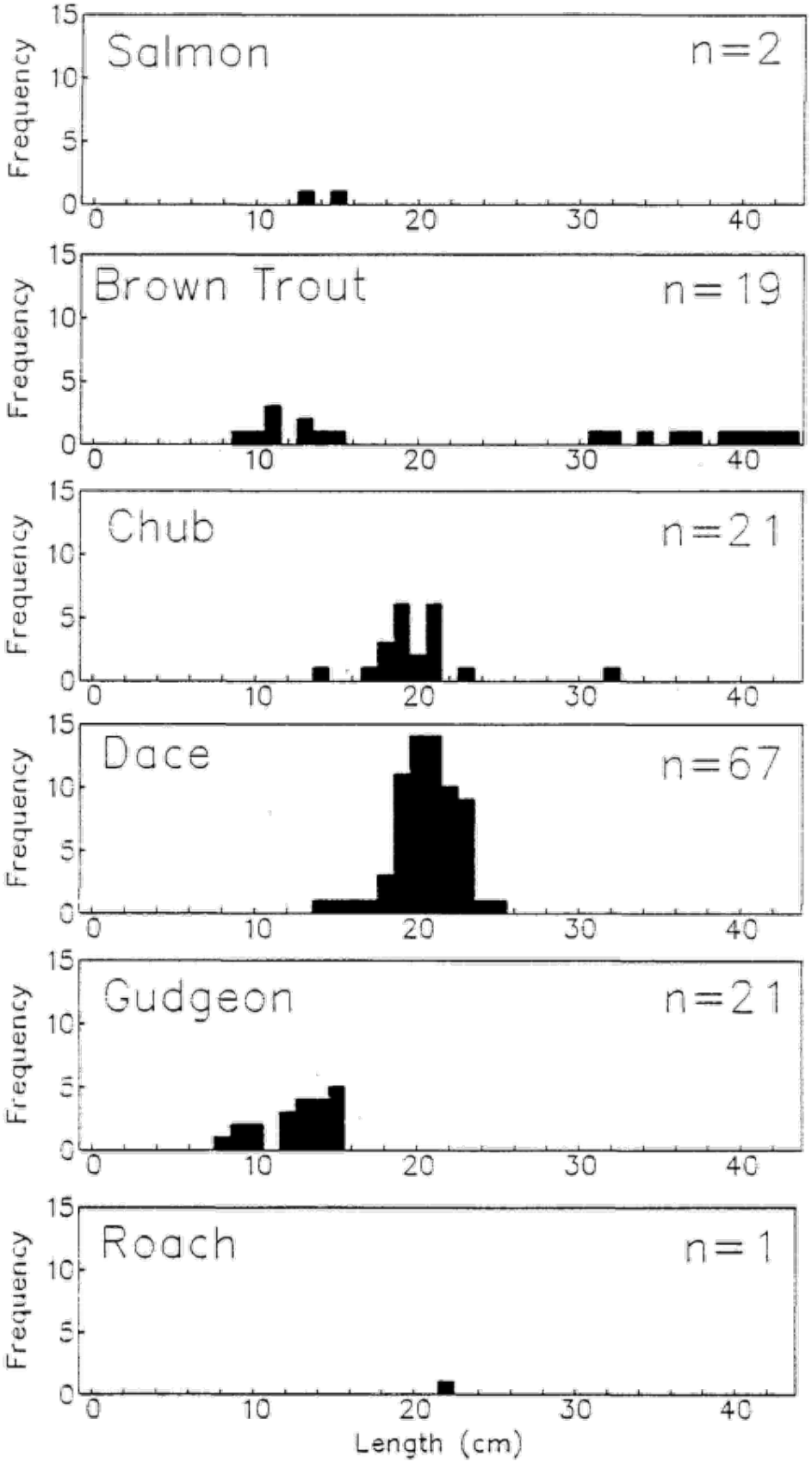


Biomass



Density

River Loddon 1991–1992
Site LOE7 U/S Bow Brook Length Frequency



SITE REPORT

WATERCOURSE : River Lyde
SITE NAME : Deanlands Farm
SITE CODE : LYAC
N.G.R : SU696543
DATE SAMPLED: 12.11.91

LAND OWNERSHIP : Mrs Maitland
ANGLING INTEREST: Mr Oppe

LENGTH: 289m **MEAN WIDTH** : 6.2m **AREA**: 1792m^2
TEMP : 4°C **CONDUCTIVITY**:

COMMENTS: A small section of the River Lyde was stocked from Deanlands Farm Bridge for approximately 400m downstream through a section of habitat improvement during March 1991. 1,000 Old Basing parr were stocked at a density of 0.42m^{-2}.

The site was electrofished through the habitat enhancement section in November 1991 when 6 salmon, 23 brown trout, 2 rainbow trout and 7 pike were caught.

The number of salmon caught was less than a quarter of that of the previous year even though they had been stocked at a higher density in 1991. The poor 1991 survival density was 0.003m^{-2} (0.126% survival) compared with a figure of 0.018m^{-2} (6.8% survival) in 1990.

The water quality of the Lyde was excellent with a class of 1A being achieved and, therefore, the decline in the numbers of salmon may be due to the continued low flows which can affect the Lyde during the summer months, although this was not the case in 1990.

In contrast to the poor salmon survival, the brown trout population showed some good recruitment and had increased from 2 in 1990 to 23 in 1991, which appeared to be good improvement. However, the previous survey had been performed using only one anode over 1 run, therefore resulting in probable underestimates of fish populations in that year.

The Lyde may not continue to be stocked until return to normal flows since survival was so poor, even in the habitat improved section, although it is not clear as to whether low flows are the main problem.

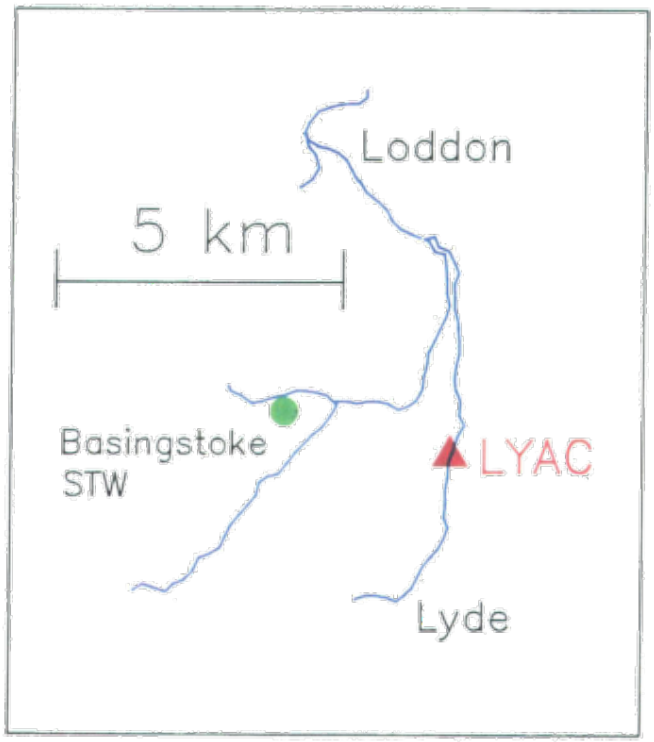
FP65 Biomass, Density and Population for Species 01/03/92

SITE LYAC SURVEY: E0054 parr survey DATE: 12/11/91

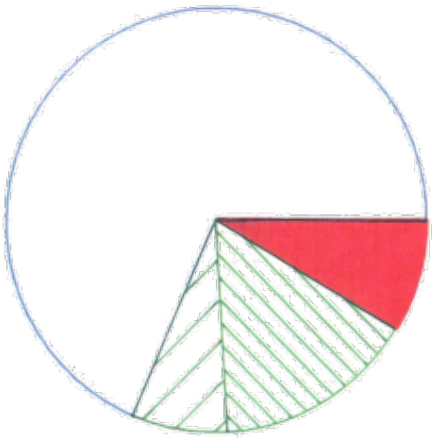
Species		Cutoff cm	Prob p	Biomass g/sqm	Density n/sqm	Upp	Low	Population Est	Upp	Low
BULLHEAD										
Present Only										
BROWN TROUT										
Seber&LeCren	>	1.0	0.69	1.198	0.013	0.016	0.012	23	29	21
Minimum Estimate	<=	1.0		0.000	0.000			0		
LAMPREY (BROOK)										
Present Only										
MINNOW										
Present Only										
PIKE										
Minimum Estimate	>	1.0	0.00	0.129	0.004	0.000	0.000	7	0	0
Minimum Estimate	<=	1.0		0.000	0.000			0		
RAINBOW TROUT										
Seber&LeCren	>	1.0	1.00	0.268	0.001	0.001	0.001	2	2	2
Minimum Estimate	<=	1.0		0.000	0.000			0		
SALMON										
Minimum Estimate	>	1.0	0.00	0.148	0.003	0.000	0.000	6	0	0
Minimum Estimate	<=	1.0		0.000	0.000			0		

Total biomass = 1.743 g/sqm Total density = 0.021 n/sqm

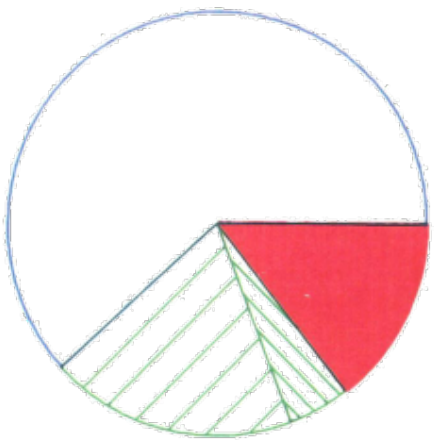
River Lyde 1991–1992
Site LYAC Deanlands Farm
Biomass And Density



	Biomass (gm−2)	Density (nm−2)
Brown Trout	1.2	0.013
Pike	0.1	0.004
Rainbow Trout	0.3	0.001
Salmon	0.1	0.003
TOTAL	1.7	0.021

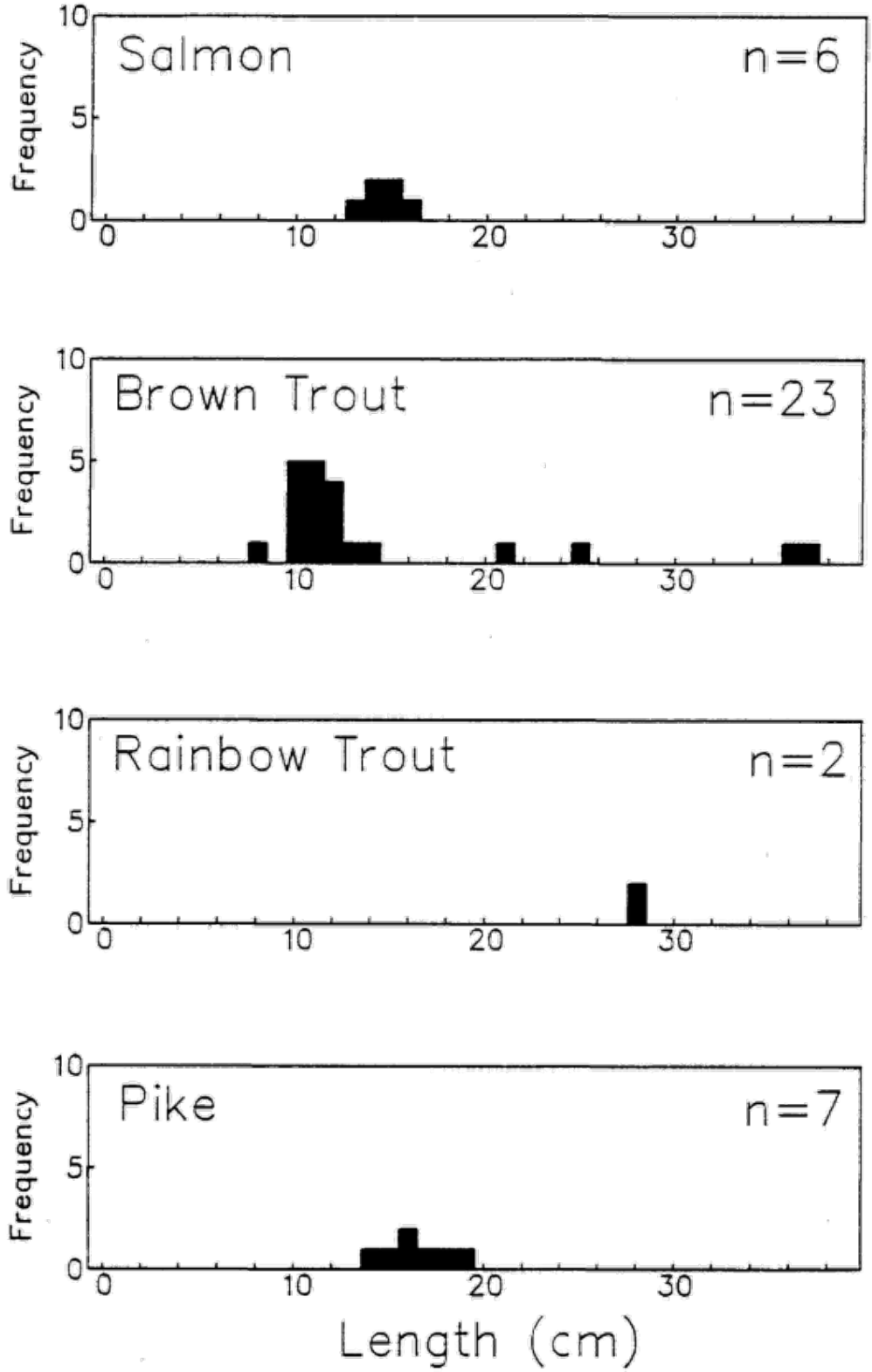


Biomass



Density

River Lyde 1991–1992
Site LYAC Deanlands Farm Length Frequency



APPENDIX I

Salmon Parr Stocking Sites - 1991

Date	River	Map Reference	Number	Density	Source
27.02.91	Loddon	SU682583-SU692608	10,342	$0.64m^{-2}$	Thames & Kielder
13.06.91		SU672543-SU677548	401	$0.08m^{-2}$	Thames & Kielder
08.03.91	Pang	SU591721-SU593722	7,083	$0.17m^{-2}$	Joseph Johnston
		SU604727-SU607730			
		SU607730-SU634735			
		SU635745-SU635764			
18.03.91	Lyde	SU696543	300		Thames/Kielder/ Old Basing
03.04.91	Lambourn	SU409732	300		Thames/Kielder/
		SU411730	300		Old Basing
		SU415725	300		
		SU419723-SU429707	3,000	$0.36m^{-2}$	
		SU429707-SU453692	1,550		
		SU457691-SU470683	2,650	$0.37m^{-2}$	
04.04.91	Enborne	SU570649-SU590661	4,835	$0.32m^{-2}$	Joseph Johnston
22.03.91	Kennet	SU491672-SU520655	21,053	$0.30m^{-2}$	Thames/Kielder/
		SU555656-SU568665			Old Basing
10.06.91	Chess	SU987994-SU996987	9,000	$0.36m^{-2}$	Langstroth
		SU999987-TQ008987			
		TQ015988-TQ028989			
18.03.91	N.Wey	SU865446-SU874435	4,730	$0.40m^{-2}$	Thames/Kielder/ Old Basing
04.02.91	S.Wey	SU859321-SU827738	5,864	$0.26m^{-2}$	Joseph Johnston
		SU823341-SU817348	1,388	$0.19m^{-2}$	
		SU812357-SU803358	2,722	$0.36m^{-2}$	
	Total Number of Parr Stocked:		**79,574**		

APPENDIX II

Salmon Survey Sites 1991

River Enborne	Wasing Farm	SU581659	ENAC
River Kennet	Hambridge, Newbury	SU490671	KTAX
	d/s Brimpton Mill	SU563658	KTA9
River Lambourn	Moor Bridge Farm	SU429707	LAAF
River Loddon	Lillymill Ford	SU684595	LOE6
	u/s Bow Brook	SU681587	LOE7
River Lyde	Deanlands Farm	SU696543	LYAC
River Wey	Heronwater	SU839328	WSHE
	Hatch Farm	SU817346	WSHG
River Chess	Mountwood	TQ025989	CHEB
	Latimer Island	TQ001987	CHNB
	Chennies (Upper)	TQ016988	CHEC
	Chennies (Lower)	TQ017988	CHEA

APPENDIX III

Parr Survival Summary 1991

STOCKING DETAILS					SURVEY DETAILS						
River	Date Stocked	Number Stocked	Stocking Density n/m^2	Source	Survey Site	Date	Population of Size	Site Density n/m^{-2}	% Survival at Site	Mean Density in River	Mean % Survival in River
CHESS	10.06.91	9,000	0.36	Langstroth	CHNB	16.01.92	20	0.032	8.9	0.032	8.97
					CHEB	16.01.92	42	0.09	25.0		
					CHEC	23.01.92	7	0.006	1.7		
					CHEA	23.01.92	1	0.001	0.28		
LAMBOURN	03.04.91	8,156	0.36	Thames/Kielder OB	LAAF	16.10.91	42	0.043	11.9		
ENBORNE	09.04.91	4,835	0.32	Joseph Johnston/ QEII	ENAC	29.10.91	7	0.011	3.4	0.011	3.4
KENNET	22.03.91	21,053	0.3	Thames/Kielder/ OB	KTAX	21.01.92	42	0.01	3.33	0.005	1.67
					KTA9	29.01.92	1	0	0		
LODDON	27.02.92	10,743	0.64	Thames/Kielder/ OB	LOE6	05.11.91	0	0	0	0.0015	0.235
					LOE7	05.11.91	2	0.003	0.47		
LYDE	18.03.91	1,000	0.42	OB/QEII	LYAC	12.11.91	6	0.003	0.126	0.003	0.126
S.WEY	04.02.91	9,974	0.19	J Johnston/	WSHG	24.10.91	21	0.034	17.9	0.026	9.6
			0.26	QEII	WSHE	14.11.91	11	0.018	6.9		