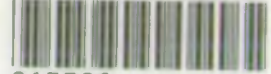


ENVIRONMENT AGENCY



015526

REGIONAL JUVENILE SALMONID

MONITORING PROGRAMME

ANNUAL REPORT 1993

REGIONAL
WELSH
ST. MELLONS

JUNE 1994



ASiantaeth Tr Amgylchedd Cymru
ENVIRONMENT AGENCY WALES

GWASANAETH LLYFRGELL A
GWYBODAETH CENEDLAETHOL

NATIONAL LIBRARY &
INFORMATION SERVICE

PRIF SWYDDFA/MAIN OFFICE

Plas-yr-Afon/Rivers House
Parc Busnes Llaneirwg/
St Mellons Business Park
Heol Fortran/Fortran Road
Llaneirwg/St Mellons
Caerdydd/Cardiff CF3 0LT

REF ID:
WELSH
NATIONAL
CLASS NO:

Introduction

The programme of juvenile salmonid stock monitoring was continued in 1993, the ninth year in succession that such a study has been carried out. The data collected is used to form baseline information on the status of juvenile stocks at both a catchment and regional level and can be used to monitor any changes to environmental factors both natural and man-made.

As a consequence of the large number of catchments in the Welsh Region (over 50) covering 20,000 km of rivers and streams and given limited resources, not all catchments can be sampled in one year. Therefore, whilst several large 'key' catchments are sampled on an annual basis the smaller catchments are sampled on a rolling programme.

Three electrofishing sampling techniques were employed during the period July to September, these being;

- 1) a catch depletion population estimate on an area of water enclosed by nets - quantitative sampling,
- 2) a one-catch minimum density on an un-netted site - semi-quantitative sampling,
- 3) a five minute sample of fry on an un-netted riffle - 5 minute riffle sampling.

The method used at each site depends upon the resources available, the level of accuracy required and the nature of the site. For example 5 minute riffle sampling is usually undertaken in main rivers where the use of enclosing nets is impractical due to the width of the river.

HABSCORE results have not been included in this report. The sites are sampled on a three year rolling programme and manpower constraints resulted in an incomplete sampling programme. It is anticipated that all sites will be sampled in 1994.

Review of Results

The 1993 survey consisted of 137 quantitative sites, 410 semi-quantitative sites and 241 5 minute riffle sites. The total of 788 sites represents an increase compared to 1992. This increase was largely due to 111 sites sampled as part of the Upper Wye survey, an area of concern highlighted in the 1992 annual report. A summary of overall Regional results is given in Tables 1 & 2.

The results for each catchment can be found in the individual Fisheries District sections. For each catchment there is a textual description of the area and also a list of Key Points from the survey results. The data obtained is displayed on colour-coded maps and a comparison with previous years made in a bar chart. Any impassable barriers affecting upstream sampling sites are marked on the maps. Where 5 minute riffle sampling was carried out a graph of the results is included with previous years data for comparison when available.

Figure 1 shows a plot of mean densities at key sites; that is sites that have been sampled annually, separately for quantitative and semi-quantitative sites. The figure shows that salmon and trout densities have generally remained stable at key sites, although mean density of 0+ salmon has declined at quantitative sites during the last two years. This decline is probably a reflection of the decrease in numbers of returning adults as a result of low summer river flows

affecting spawning success between 1990 and 1992. The summer of 1993 was much wetter and higher densities are expected in the 1994 survey.

Figures 3 & 4 give comparisons of mean densities of salmon and trout in 1993 and previous years at key sites for individual rivers. These figures can be interpreted as follows: if a river lies to the above left of the diagonal line then a decrease in mean densities has been recorded in 1993 in comparison to the mean for previous years. Conversely a river below the line has had an increase recorded. Increasing distance from the line indicates a larger change, thus those rivers lying close to the line are unlikely to have undergone significant change. Caution must be used when analysing the results as the precise significance, especially given the many variables involved, is often unknown.

The Figures show that generally densities of both salmon and trout fry have remained stable as indicated by the low level of variation from the diagonal. Salmon fry (0+) density appears to have continued to decrease in the Wye noted in 1992, although as mentioned earlier this may be related to low numbers of returning adults. Salmon fry densities at semi-quantitative sites in the Teifi appear to have declined, although fry densities at quantitative sites show a slight increase. Salmon fry densities in other rivers generally appear to exhibit stable populations.

Salmon parr (>0+) densities again appear to be stable in most catchments although there does appear to be a decline in densities in the Teifi, a decrease in densities at key sites in both quantitative and semi-quantitative sites being noted.

Trout densities have declined in the Clwyd catchment compared to the last few years, three of four graphs showing a decline (Figure 3). Other catchments appear to exhibit stable populations.

The 1992 survey highlighted a problem in the upper Wye catchment and as a consequence a detailed survey took place in 1993. The conclusions of the survey were that declines in juvenile salmonids were caused by a number of factors, the following being identified.

- 1) Acidification of upper River Wye and Bidno.
- 2) Partial barriers to upstream migration on Marteg, Cnyffiad and Chwefru.
- 3) Clear felling of Forestry Commission plantations in certain parts of the catchment being a potential source of high suspended solids loadings.
- 4) A decrease in the number of returning adult spawners.

The report recommends a series of actions to establish rehabilitation programmes and instigate remedial measures supported by monitoring.

To conclude, populations of juvenile salmon have remained generally stable, any slight decline being due to a decrease in the number of spawners, whilst trout population are beginning to recover following a period of decline. However, the 1993 survey highlighted the following two areas of concern:-

- 1) Salmon densities have declined in the River Teifi.
- 2) Trout densities show a decline in the Clwyd catchment compared to previous years.

Future Programme

A review of the monitoring programme is currently being carried out. So far this has recognised the value of well defined objectives and the need to establish a long time series of data. It was also recognised that resources are limited and must be used effectively. It is proposed that the original objectives of the programme are redefined as follows:

- 1) To establish and maintain a database of information on the distribution and relative abundance of salmon and trout, by sampling a minimum of once every five years on all catchments within the Region. This will be achieved by means of semi-quantitative and 5 minute riffle sites covering all major tributaries and main river.
- 2) To monitor trends and changes in abundance of salmon and trout by annual sampling at key sites on the following rivers:

Conwy, Dee, Teifi, Tywi, Usk & Wye.

The sampling of key rivers will be a priority each year to ensure the time series at these sites is maintained.

It was further recommended that future reports will include a District summary which will give a summary of key points and actions for rivers. A review of the action plan will be included in subsequent reports to ensure that highlighted problems are investigated and reported.

A full report of the review will be produced during 1994.

The tables below summarise the results of the 1993 regional Monitoring Programme.

TABLE 1. REGIONAL SUMMARY - QUANTITATIVE SITES

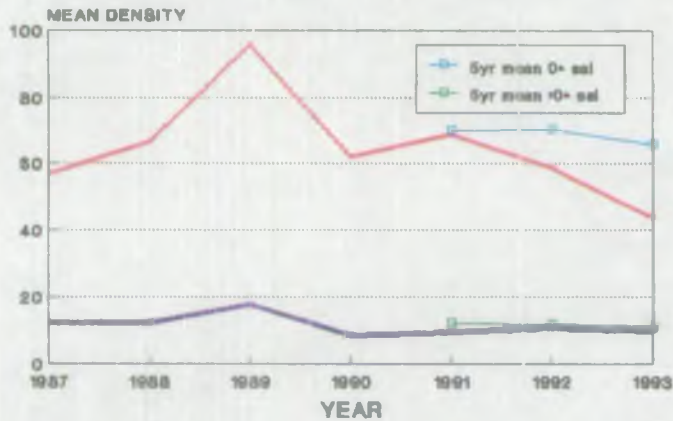
RIVER SURVEYED	No. OF SITES	SALMON				TROUT			
		MEAN DENSITY/100m ²			CLASS	MEAN DENSITY/100m ²			CLASS
		0+	1+	>1+		0+	1+	>1+	
CLWYD	4	14.9	8.6	0.3	C	29.7	10.2	1.9	B
CONWY	22	35.9	9.3	0	B	27.2	9.8	0.9	B
DEE	15	26.4	4.5	0	C	16.3	5.8	1.4	C
DWYFAWR	6	36.9	7.7	0	B	22.0	8.6	3.9	C
DYFI	5	16.4	1.3	0	D	61.5	13.5	1.3	B
USK	13	10.2	22.2	0.1	B	6.3	9.3	2.2	C
WYE	21	46.6	4.5	0	C	9.5	4.5	1.9	C
UPPER WYE ADD	21	22.3	3.2	0	D	10.5	2.6	3.9	C
TEIFI	16	56.1	12.0	0	B	24.8	21.6	3.0	B
TYWI	14	6.9	2.8	0	D	24.0	18.2	3.9	B

TABLE 2. REGIONAL SUMMARY - SEMI-QUANTITATIVE SITES

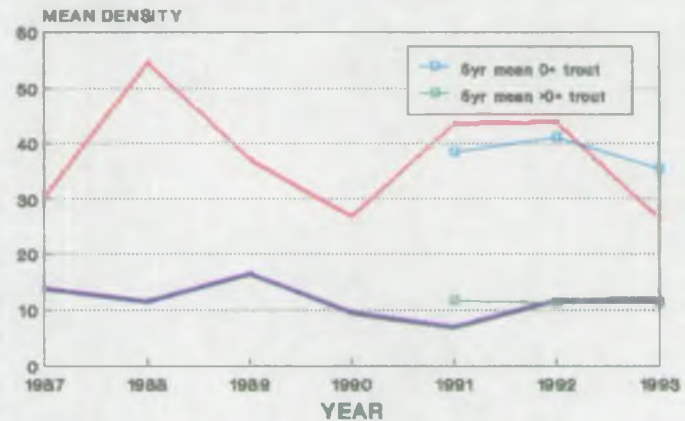
RIVER SURVEYED	No. OF SITES	SALMON				TROUT			
		MEAN DENSITY/100m ²			CLASS	MEAN DENSITY/100m ²			CLASS
		0+	1+	>1+		0+	1+	>1+	
BRAINT	9	0	0	0	E	28.8	7.4	2.2	B
CLWYD	14	3.8	2.0	0	D	11.2	7.7	2.7	C
CONWY	2	3.4	1.7	0	D	0.6	0	0	D
DEE	11	17.1	3.1	0	B	8.5	2.4	1.0	C
DWYFAWR	23	10.4	2.6	0	B	12.5	4.1	2.5	B
DYFI	13	9.4	3.2	0	C	12.2	5.6	2.2	B
LLYFNI	15	8.1	6.1	0.1	C	29.4	10.1	4.3	A
WYGYR	5	0	0	0	E	18.0	4.3	1.0	B
LWYD	10	0	0	0	E	8.1	4.8	6.9	B
TAFF	8	0	0.2	0	D	0.7	6.1	3.2	C
USK	34	4.9	5.1	0.1	C	2.7	7.0	3.8	B
UPPER WYE	34	15.1	2.8	0	B	10.5	6.2	2.2	B
LOWER WYE	33	0.1	0	0	D	7.1	3.4	4.1	C
UPPER WYE ADD	83	12.8	2.3	0	B	5.9	1.8	2.2	C
NEATH	16	0.6	0.4	0	D	8.7	14.6	1.5	B
TAF	40	3.7	0.6	0	D	11.9	10.1	3.0	B
TAWA	21	0.1	1.7	0	D	6.9	12.7	2.2	B
TEIFI	19	12.5	6.4	0	C	13.0	19.3	2.4	A
TYWI	20	4.1	4.7	0	C	13.8	9.6	2.2	B

Figure 1. MEAN DENSITIES AT KEY SITES

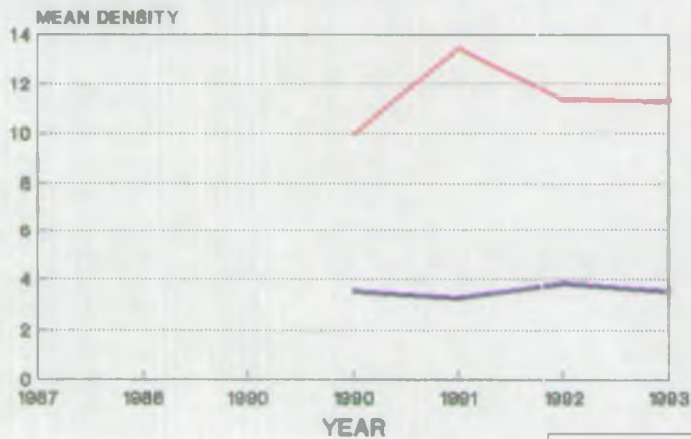
MEAN SALMON DENSITIES AT KEY QUANTITATIVE SITES 1987-93



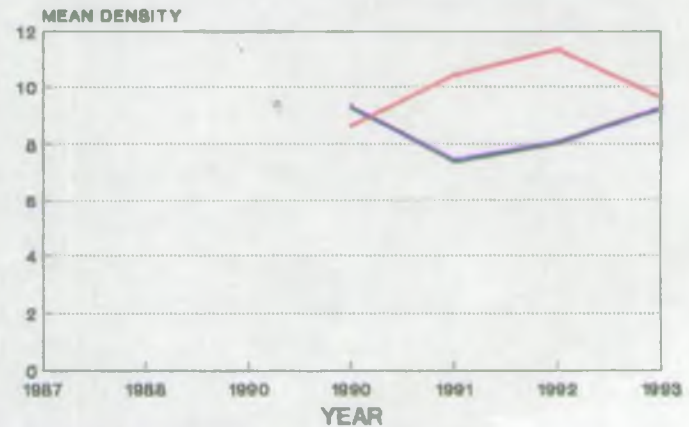
MEAN TROUT DENSITIES AT KEY QUANTITATIVE SITES 1987-93



MEAN SALMON DENSITIES AT KEY SEMI-QUANTITATIVE SITES 1990-93



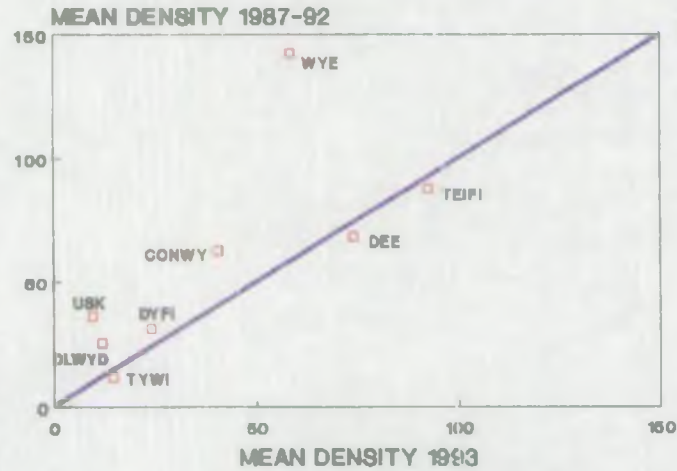
MEAN TROUT DENSITIES AT KEY SEMI-QUANTITATIVE SITES 1990-93



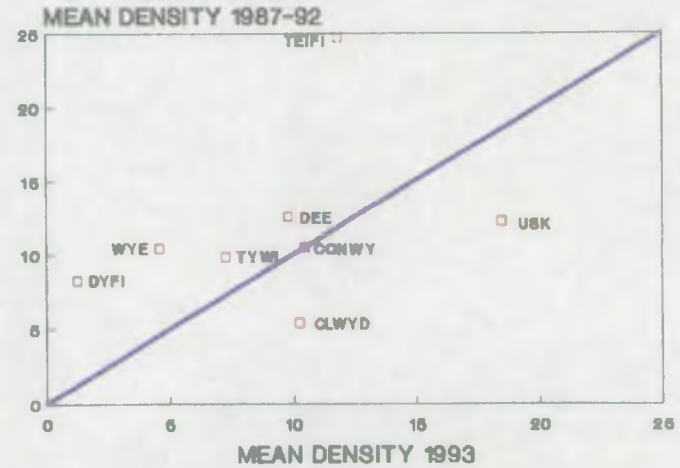
■ 0+ ■ >0+

Figure 2. Mean densities of salmon at key sites in 1993 and in previous years.

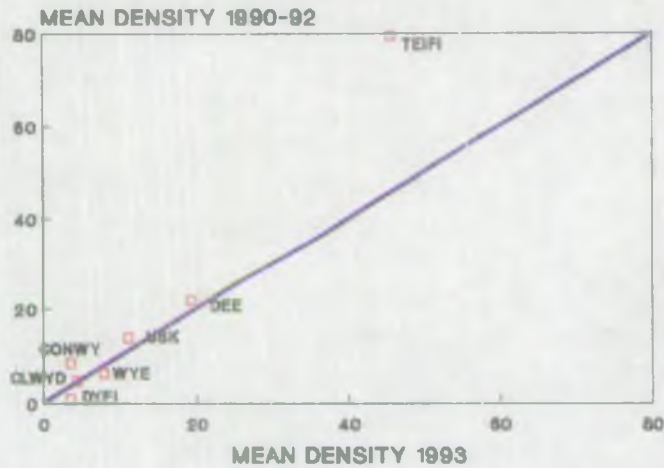
a) 0+ SALMON • QUANTITATIVE SITES



b) >0+ SALMON • QUANTITATIVE SITES



c) 0+ SALMON • SEMI-QUANT' SITES



d) >0+ SALMON • SEMI-QUANT SITES

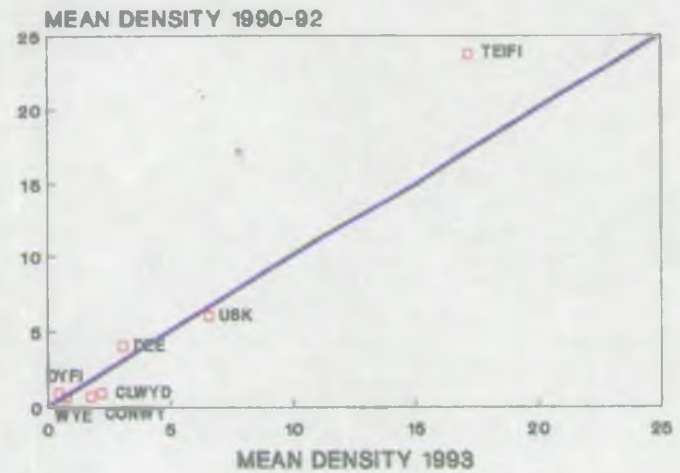
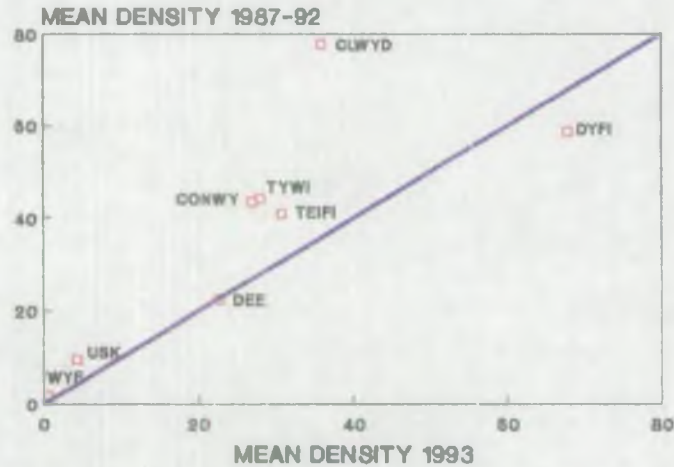
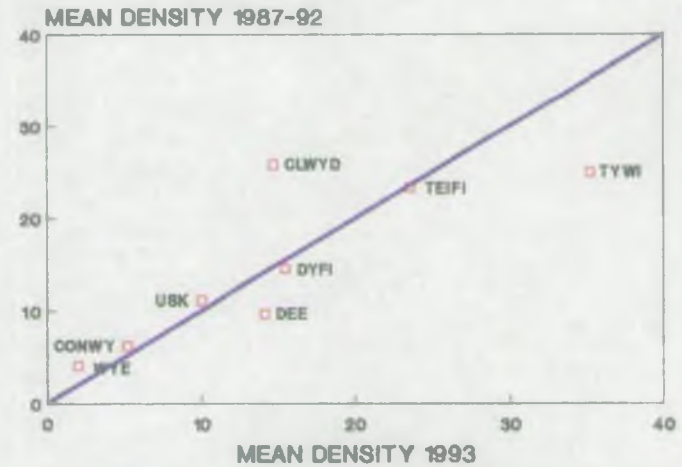


Figure 3. Mean densities of trout at key sites in 1993 and in previous years.

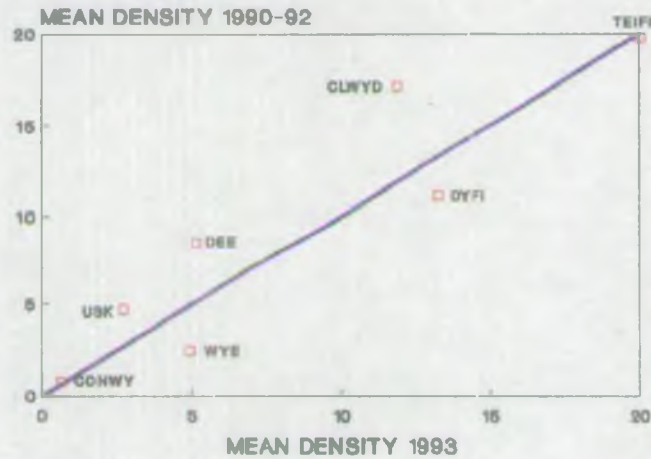
a) 0+ TROUT @ QUANTITATIVE SITES



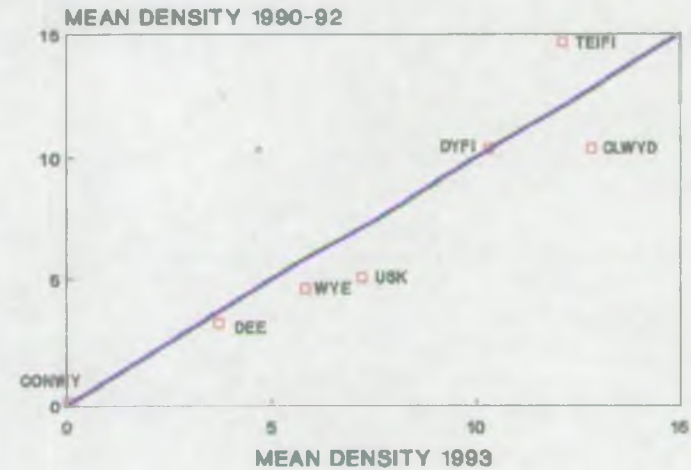
b) >0+ TROUT @ QUANTITATIVE SITES



c) 0+ TROUT @ SEMI-QUANT SITES



d) >0+ TROUT @ SEMI-QUANT SITES



APPENDIX 1

Abundance categories (numbers 100 m²) for juvenile salmonids.

	<u>Quantitative</u>		<u>Semi-Quantitative</u>	
	Fry (0+)	Parr (>0+)	Fry (0+)	Parr (>0+)
Excellent	>100	>25	>50	>20
Good	50.01-100	15.01-25	22.5-50	10.01-20
Moderate	25.01-50	5.01-15	10.01-22.5	2.26-10
Poor	0.01-25	0.01-5	0.01-10	0.01-2.25
Absent	0	0	0	0

Classification Matrix for Juvenile Salmonids

		<u>Fry (0)+</u>				
		Excellent	Good	Moderate	Poor	Absent
<u>Parr</u> (>0+)	Excellent	A	A	A	B	C
	Good	A	A	B	B	C
	Moderate	A	B	B	C	D
	Poor	B	B	C	D	D
	Absent	C	C	D	D	E

APPENDIX 2

Key for Non-Salmonid Species Recorded

B	-	Bullhead	L	-	Lamprey
Ba	-	Barbel	M	-	Minnow
Bl	-	Bleak	P	-	Pike
Br	-	Bream	Pe	-	Perch
C	-	Charr	Rt	-	Rainbow trout
Ca	-	Carp	Ro	-	Roach
Ch	-	Chub	Ru	-	Rudd
Cr	-	Crayfish	S	-	Stickleback
D	-	Dace	Sh	-	Shad
E	-	Eel	St	-	Stoneloach
Fl	-	Flatfish	T	-	Tench
Gu	-	Gudgeon			