DEVON AREA REPORT

RIVER LYN FISHERIES SURVEY 1994

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CONTENTS

RIVER LYN FISHERIES SURVEY 1994

1) INTRODUCTION

A survey of the distribution of freshwater fish was conducted throughout the River Lyn catchment during the period of June to September 1994. The survey was undertaken as part of a triennial programme to monitor fish stocks in the River Lyn.

Comprehensive surveys were carried out in 1982 and 1991. Limited quantitative surveys were carried out in 1980 (Lister) and 1983.

2) METHODS

A total of twenty six sites were chosen throughout the catchment. Twenty four sites were surveyed quantitatively, the remaining two, semi-quantitatively. Site selection was based upon physical accessibility, geographical distribution and habitat characteristics. Site distribution and locations are shown in Figure 1. Site details are given in Table 1.

2.1 Site Clustering

Since 1992, routine sampling has included single-run sites in addition to three-run sites. Sites are clustered on a ' target area ' basis - one three-run site is associated with up to four single-run sites. A typical ' cluster ' will consist of five sites. The three-run site should be fished first, and should be immediately followed by the single-run sites in that cluster. All sites in a cluster should be fished by the same team of people, with each person performing the same task.

2.2 Fieldwork

All sites were fished using a 240 Volt, 500 Watt generator producing pulsed direct current (PDC) via a control box. Fishing was carried out in an upstream direction, using a single anode.

a) **Quantitative Surveys.**

Quantitative surveys were carried out using a combination of triple and single shock sites. All sites were between 50 and 100 metres in length, isolated by stop nets. All salmonids were counted, measured (to the nearest mm) and identified by species. The numbers of other species were noted but not removed during the electric fishing process. A subjective assessment of numbers of each species was made using the following abundance indicator :-

Present	- 1-10
Common	- 11-100
Abundant	- >100

b) **Semi-quantitative Surveys.**

Semi-quantitative sites were fished for a timed period of twenty minutes. Species were handled in the same way as for quantitative sites.

All fish were returned to the watercourse unharmed.

Population estimates for triple shock sites were obtained according to the methods described by Harding, Heathwood et al (1984). For single shock sites, population estimates were made using the multiplication factor (N/C1) - where C1 = catch one and N = population estimate, derived from the appropriate triple shock site associated with that cluster.

3) RESULTS AND DISCUSSION

The results are given in the form of estimated population densities (Numbers/100m^2) in Table 2. Data for salmonid species are split into densities for fry (0+) and combined for age groups of older fish (1++).

Historic salmonid data is presented in Tables 3 and 4 to allow comparison with data collected in this survey. The presence or absence of non-salmonid species is recorded in Table 2.

3.1 Salmon (Salmo salar. L.)

Juvenile salmon appear to be restricted in distribution to the East Lyn River and the lower reaches of the Badgworthy Water, the Oare Water and the Weir Water. The absence of salmon from the remainder of the catchment may be explained by the physical nature of the catchment, with high gradient stream sections and natural barriers limiting upstream migration of adult fish. A consequence of this is the sporadic presence of juveniles at the upstream sites on the Badgworthy Water and Oare Water, which attests to the limited number of adults reaching these areas to spawn. Further evidence of this is the presence of salmon parr in limited numbers on the Weir Water. Prior to 1994, salmon have been absent from this tributary. An explanation for their presence in this survey may be the high flows experienced during 1992 which allowed migratory adults passage beyond their "normal" limit of penetration.

In general the distribution and abundance of fry was similar to those recorded in the 1982 and 1991 surveys. Fry densities throughout the catchment are non-uniform in distribution, with very low densities recorded at some sites (eg, Staghunters 1.94 100/m^2 and Rockford 0.71 100/m^2) and good densities at others (eg, Barton Wood 50.39 100/m^2). Fry densities in the East Lyn River in 1994 (range 0.71 - 50.39 100/m^2) were broadly similar to those recorded in 1991 (range 0.49 - 35.0 100/m^2) and 1982 (range 0.96 - 43.22 100/m^2). Fry densities on the Badgworthy Water (range 0.74 - 10.04 100/m^2) were lower than in 1991 (range 12.9 - 51.01 100/m^2). On the Oare Water fry densities increased from a range of 0 - 0.26 100/m^2 in 1991 to 1.53 - 10.99 100/m^2 in 1994.

The distribution of salmon parr was similar to that of previous years. The density range for the East Lyn River sites in 1994 (4.74 - 26.8 100/m^2) compares favourably with those recorded in 1991 (2.1 - 9.07 100/m^2) and 1982 (0.22 - 4.88 100/m^2). A similar situation exists on the Badgworthy and Oare Waters. This would indicate good recruitment in 1993.

3.2 Trout (Salmo trutta.L.)

Trout fry were present at all sites but one (site 16 Coombe Park). Fry densities throughout the catchment (range 0 - 30.06 /100m^2) are lower than in 1991 (range 0.55 - 89.31 /100m^2) and 1982 (range 15.91- 174.48 /100m^2). This decline in fry abundance is possibly caused by several factors. During the intra-gravel stage and shortly after emergence fry are extremely vulnerable to high flows which wash out redds, displace fish from suitable habitates and consequently cause mortalities. Fry survival rates can also be affected by intra-species and inter-species competition. Where suitable habitats are scarce further reductions in the fry population would be expected.

Trout parr were also present throughout the catchment. However, in contrast to fry, trout parr densities in the catchment (range 4.75 - 64.10 /100m^2) were generally uniform when compared to 1991 (range 10.84 - 54.04 /100m^2) and 1982 (range 9.02 - 73.94 /100m^2). This comparative uniformity contrasts sharply with the observed decline in fry densities. Parr are able to utilize a diverse range of habitat types and are consequently less likely to suffer mortalities through displacement, habitat destruction or competition. Consequently parr survival in the Lyn catchment is reliable.

The River Lyn is well known for its sea trout run. This tends to be a complication as it is not possible to distinguish between juvenile resident trout and juvenile migratory trout. It is likely that a good proportion of fry and parr recorded are sea trout progeny. Concern has been expressed that the sea trout run has declined in recent years. There is however no evidence to support this as the mean rod catch for the last ten years (1983 - 1993) has been 97.8 (see Appendix 2), this compares with a rod catch of 135 in 1993. Data for 1994 is not yet available.

4) CONCLUSIONS

i) Salmon fry densities are non-uniform and generally low, possibly a result of sporadic spawning and the physical difficulties faced by both migrating adults and juveniles.

ii) Salmon parr densities were the highest ever recorded. It is encouraging to note the presence of parr in the Weir water for the first time, although this is probably a consequence of high flows during 1992 which allowed greater adult penetration.

iii) Rod and net catch data for salmon show no decline in the numbers of returning adults.

iv) Juvenile salmon densities maybe improved if adult escapement could be increased.

v) Trout fry densities have been in decline over the last ten or twelve years.

vi) Trout parr densities are stable and have not varied significantly over the last ten to twelve years.

vii) Rod and net catch data for sea trout show no decline in the return of migrating adults.

5) RECOMMENDATIONS

i) Further investigative work should be considered to identify the cause of the poor distribution and abundance of fry. In particular a survey of spawning and nursery habitats in order to ascertain availability and condition.

REFERENCES

HARDING, A.W. HEATHWOOD, R.G HUNT and K.L.Q. READ, 1984. The Estimation of Animal Population Size by the Removal Method. The Journal of the Royal Statistical Society Series C (Applied Statistics). Volume 33, No2, 1984.

LISTER, R.C.W; 1980. Fisheries Survey of the River Lyn and its Tributaries, South West Water Authority, Directorate of Fisheries and Recreation.

APPENDIX A.

TABLE 1 - SITE DETAIL SHEET

TABLE 2 - SUMMARY SHEET

TABLE 3 - ALL SURVEYS 1980-1994 SALMON DENSITIES

TABLE 4 - ALL SURVEYS 1980-1994 TROUT DENSITIES

FIGURE 1 - SITE DISTRIBUTION MAP

RIVER LYN FISH SURVEY 1994 - SITE DETAIL SHEET

RIVER	SITE NO	SITE NAME		N.G.R.	CLUSTER
EAST LYN RIVER	1	Glebe Farm	SS	793 482	b
	2	Southern Wood	SS	786 483	B
	3	U/s Leeford	SS	777 482	a
	4	Staghunters	SS	767 483	A
	5	Rockford	SS	756 478	a
	6	Barton Wood	SS	744 489	a
	7	Lynmouth	SS	725 494	*
	8	U/s Myrtleberry	SS	744 489	*
HOAROAK WATER	9	Roborough Castle	SS	736 458	d
	10	Combe Park	SS	736 475	d
FARLEY WATER	11	Farleywater Farm	SS	743 461	d
	12	Hillsford	SS	741 477	d
BADGEWORTHY WATER	13	Deerpark	SS	795 459	c
	14	Malmshead	SS	792 477	C
OARE WATER	15	Oareford	SS	812 464	b
	16	Oare House	SS	803 474	b
CHALK WATER	17	Chalk Water	SS	815 458	c
WEIR WATER	18	Robbers Bridge	SS	823 464	c
WEST LYN RIVER	19	Furzehill	SS	724 450	D
	20	Radsbury	SS	718 461	e
	21	East Ilkerton	SS	713 469	e
BARBROOK RIVER	22	Shallowford	SS	714 449	f
	23	Thornworthy	SS	709 456	F
	24	West Ilkerton	SS	703 465	f
	25	Outovercott	SS	702 470	f
	26	Barbrook P.S	SS	709 478	E

Key
Upper case = 3 run site
Lower case = 1 run site
* = Semi-quantitative site

TABLE 2

RIVER LYN FISH SURVEY 1994 - SUMMARY SHEET

WATERCOURSE	SITE NAME	N.G.R.
EAST LYN	Glebe Farm	SS 793 482
	Southern Wood	SS 786 483
	U/s Leeford	SS 777 482
	Staghunters	SS 767 483
	Rockford	SS 756 478
	Barton Wood	SS 752 488
	Myrtleberry	SS 744 489
	Lynmouth	SS 725 494
HOAROAK WATER	Roborough Castle	SS 736 458
	Combe Park	SS 736 475
FARLEY WATER	Farleywater Farm	SS 743 461
	Hillsford	SS 741 477
BADGEWORTHY WATER	Deerpark	SS 795 459
	Malmsmead	SS 792 477
OARE WATER	Oareford	SS 812 464
	Oare House	SS 803 474
CHALK WATER	Chalk Water	SS 815 459
WEIR WATER	Robbers Bridge	SS 823 464
WEST LYN	Furzehill	SS 724 450
	Radsbury	SS 718 461
	East Ilkerton	SS 714 475
BARBROOK	Shallowford	SS 714 449
	Thornworthy	SS 709 456
	West Ilkerton	SS 703 465
	Outovercott	SS 702 470
	Barbrook P.S	SS 709 478

KEY
B = Bullhead
E = Eel
SL = Stone Loach
@ = Species Absent
# = Species Present

SALMON DENSITY (100m2)		TROUT DENSITY (100m2)		OTHER
FRY	PARR	FRY	PARR	SPECIES
2.67	10.22	2.67	13.03	@
0.00	5.02	2.27	20.87	@
4.10	15.39	8.45	11.63	B,E
1.94	26.80	6.99	14.57	@
0.71	4.74	0.84	41.46	E,
50.39	7.26	3.98	4.75	E,
#	#	#	#	E,
#	#	#	#	E,
0.00	0.00	2.77	21.74	@
0.00	0.00	0.00	34.66	@
0.00	0.00	1.38	70.47	@
0.00	0.00	4.45	53.35	@
10.04	12.65	23.99	7.19	@
0.74	11.72	3.35	33.49	@
1.53	5.38	17.74	25.86	B,
10.99	14.47	30.06	22.13	@
0.00	0.00	12.73	57.61	@
0.00	10.43	45.77	52.06	B,
0.00	0.00	1.30	51.39	B,
0.00	0.00	24.88	64.10	B,
0.00	0.00	10.88	46.99	B,
0.00	0.00	15.39	32.74	B,SL
0.00	0.00	9.84	30.43	B,SL
0.00	0.00	3.07	58.59	B,SL
0.00	0.00	2.49	35.62	B,SL
0.00	0.00	6.16	33.73	SL

TABLE 3

RIVER LYN - ALL SURVEYS 1980 - 1994 SALMON DENSITIES

WATERCOURSE	SITE NAME	SALMON FRY (0+) 1980	1982	1983
EAST LYN	Glebe Farm	-	22.84	-
	Southern Wood	17.89	6.93	-
	U/s Leeford	-	5.14	-
	Staghunters	0.00	43.22	-
	Doctors Ford	-	6.10	-
	Rockford	0.00	0.00	-
	Barton Wood	-	-	-
	Myrtleberry	0.25	0.96	-
	Lynmouth	-	14.10	-
HOAROAK	Roborough Castle	-	-	-
	Combe Park	-	-	-
FARLEY WATER	Farley Water Farm	-	-	-
	Hillsford	-	-	-
BADGEWORTHY WATER	Deerpark	-	-	0.00
	Malmsmead	-	-	-
OARE WATER	Oareford	0.00	0.00	-
	Oare House	0.00	36.08	-
CHALK WATER	Chalk Water	0.00	0.00	-
WEIR WATER	Robbers Bridge	0.00	0.00	-
WEST LYN	Furzehill	-	-	-
	Radsbury	-	-	-
	East Ilkerton	-	-	-
	Lynbridge	-	-	-
BARBROOK	Shallowford	-	-	-
	Thornworthy	-	-	-
	West Ilkerton	-	-	-
	Outovercott	-	-	-
	Barbrook P.S	0.00	-	-

KEY
= present
@ = Absent

PARR (1+) AND OLDER						
1991	1994	1980	1982	1983	1991	1994
14.62	2.67	-	3.70	-	6.46	10.22
35.00	0.00	3.76	4.62	-	2.10	5.02
-	4.10	-	1.38	-	-	15.39
31.52	1.94	16.63	0.57	-	2.99	26.80
-	-	-	1.43	-	-	-
2.33	0.71	7.11	0.22	-	3.40	4.74
-	50.39	-	-	-	-	7.26
6.87	#	1.73	0.68	-	8.47	#
0.49	#	-	4.88	-	9.07	#
0.00	0.00	-	-	-	0.00	0.00
0.00	0.00	-	-	-	0.00	0.00
0.00	0.00	-	-	-	0.00	0.00
0.00	0.00	-	-	-	0.00	0.00
12.91	10.04	-	-	9.24	6.69	12.65
51.01	0.74	-	-	-	2.02	11.72
0.00	1.53	0.00	0.00	-	0.00	5.38
0.26	10.99	2.13	0.89	-	4.78	14.47
0.00	0.00	0.00	0.00	-	0.00	0.00
0.00	0.00	0.00	0.00	-	0.00	10.43
0.00	0.00	-	-	-	0.00	0.00
-	0.00	-	-	-	-	0.00
0.00	0.00	-	-	-	0.00	0.00
0.00	-	-	-	-	0.00	-
-	0.00	-	-	-	-	0.00
0.00	0.00	-	-	-	0.00	0.00
-	0.00	-	-	-	-	0.00
-	0.00	-	-	-	-	0.00
0.00	0.00	0.00	-	-	0.00	0.00

TABLE 4

RIVER LYN 1980 - 1994 TROUT DENSITIES

WATERCOURSE	SITE NAME	TR OUT FRY (0+)			
		1980	1982	1983	1991
EAST LYN	Glebe Farm	-	39.82	-	32.34
	Southern Wood	2.88	15.91	-	9.48
	Lee Ford	-	69.02	-	-
	Staghunters	36.65	68.07	-	19.32
	Doctors Ford	-	101.50	-	-
	Rockford	12.71	49.56	-	6.80
	Barton Wood	-	-	-	-
	Myrtleberry	14.55	18.31	-	18.54
	Lynmouth	-	12.59	-	0.98
HOAROAK	Roborough Castle	-	-	-	7.05
	Combe Park	-	-	-	0.84
FARLEY WATER	Farley Water	-	-	-	0.55
	Hillsford	-	-	-	43.10
BADGEWORTHY WATER	Deerpark	-	-	17.56	55.96
	Malmsmead	-	-	-	32.82
OARE WATER	Oareford	11.43	53.19	-	62.92
	Oare House	124.89	133.18	-	89.31
CHALK WATER	Chalk Water	24.73	33.13	-	9.04
WEIR WATER	Robbers Bridge	70.13	174.48	-	79.18
WEST LYN	Furzehill	-	-	-	-
	Radsbury	-	-	-	-
	East Ilkerton	-	-	-	1.75
	Lynbridge	-	-	-	10.64
	Shallowford	-	-	-	-
	Thornworthy	-	-	-	4.50
BARBROOK	West Ilkerton	-	-	-	-
	Outovercott	-	-	-	-
	Barbrook P.S	12.62	-	-	4.12

KEY

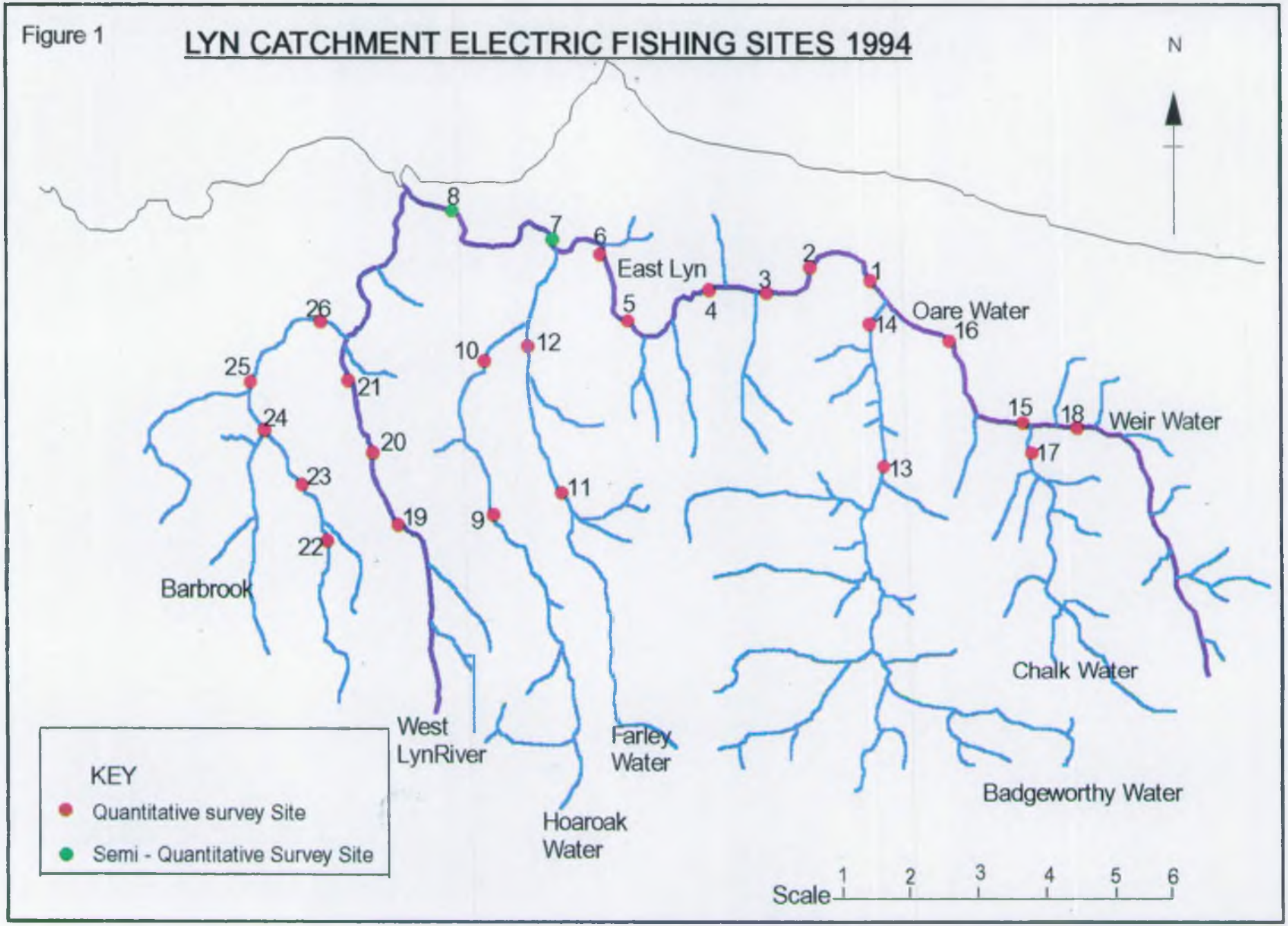
= Present

@ = Absent

PARR (1+) AND OLDER

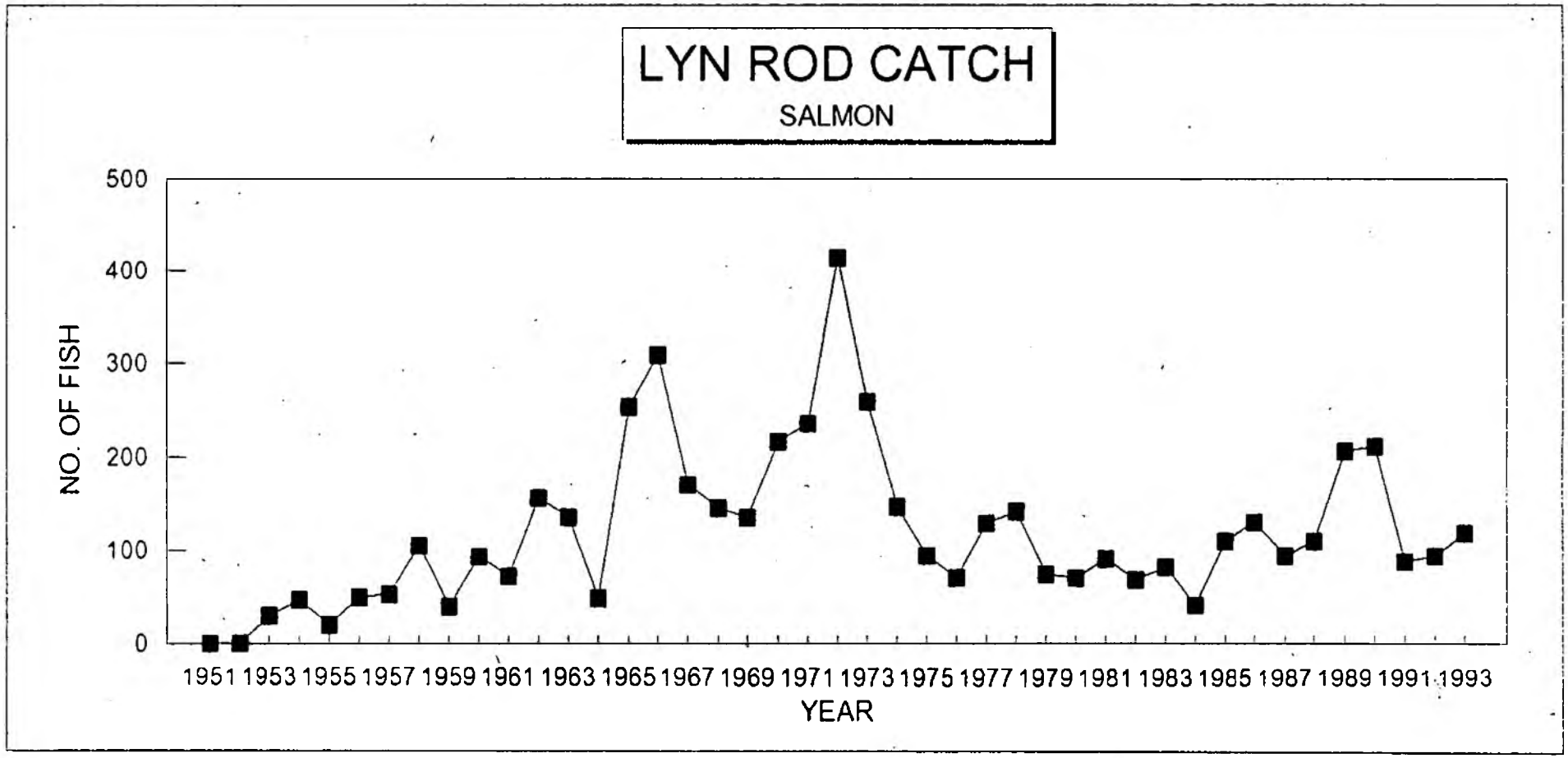
1994	1980	1982	1983	1991	1994
2.67	-	37.35	-	34.59	13.03
2.27	27.66	45.44	-	39.43	20.87
8.45	-	66.25	-	-	11.63
6.99	61.02	42.65	-	26.23	14.57
-	-	34.81	-	-	-
0.84	85.07	40.63	-	36.98	41.46
3.98	-	-	-	-	4.75
-	22.79	18.72	-	33.57	-
-	-	09.02	-	25.07	-
2.77	-	-	-	44.79	21.74
0.00	-	-	-	18.05	34.66
1.38	-	-	-	36.07	70.47
4.45	-	-	-	26.25	53.35
23.99	-	-	116.50	10.84	7.19
3.35	-	-	-	54.04	33.49
17.74	61.36	67.88	-	24.29	25.86
30.06	39.52	73.94	-	23.39	22.13
12.73	98.34	31.36	-	52.48	57.61
45.77	70.70	85.93	-	37.75	52.06
1.30	-	-	-	53.57	51.39
24.88	-	-	-	-	64.10
10.88	-	-	-	20.61	46.99
	-	-	-	14.48	-
15.39	-	-	-	-	32.74
9.84	-	-	-	28.17	30.43
3.07	-	-	-	-	58.59
2.49	-	-	-	-	35.62
6.16	41.68	-	-	19.55	33.73

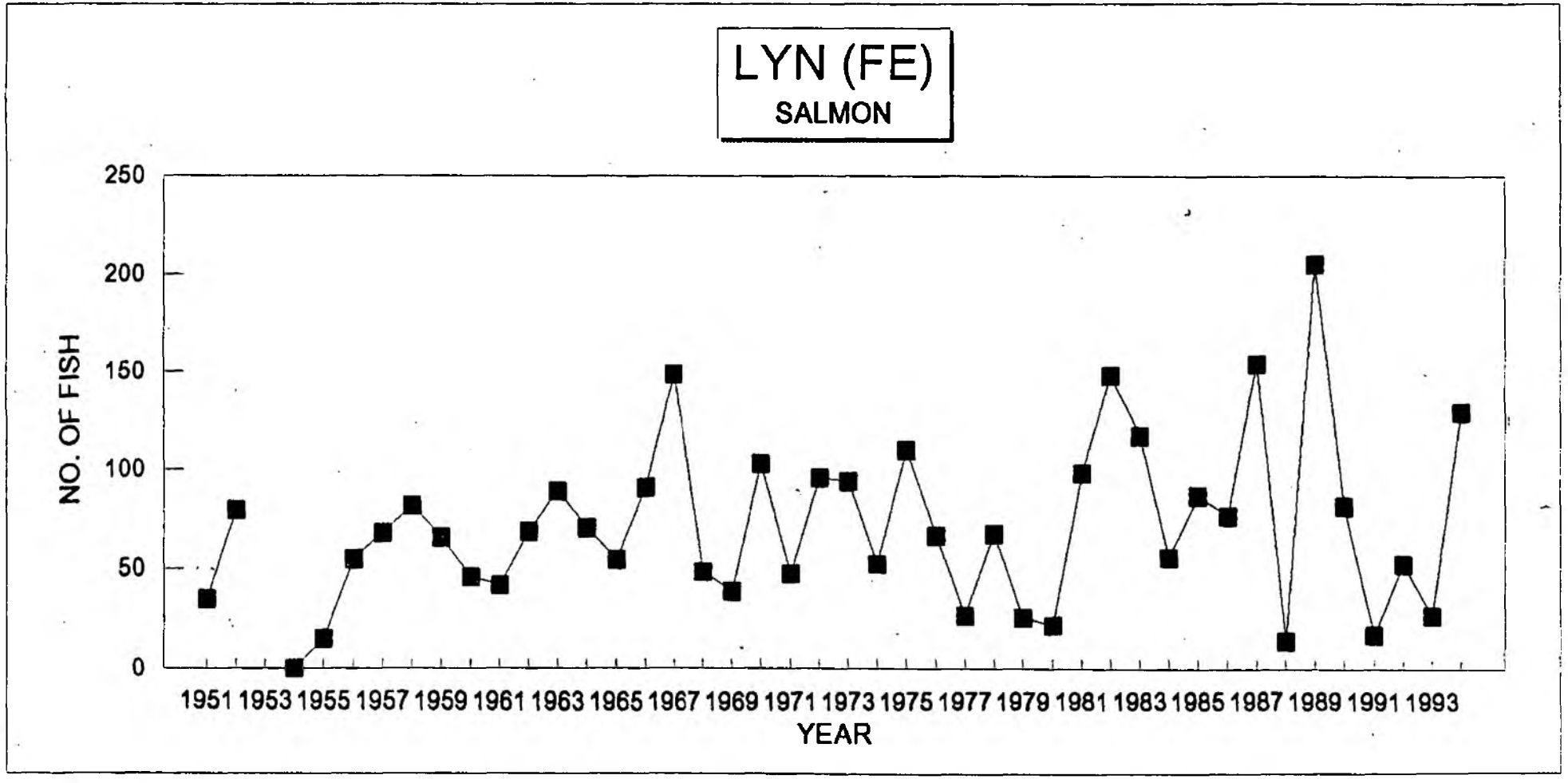
Figure 1


LYN CATCHMENT ELECTRIC FISHING SITES 1994
N
East Lyn
Oare Water
Weir Water
Chalk Water
Badgeworthy Water
Barbrook
West LynRiver
Farley Water
Hoaroak Water
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
KEY
Quantitative survey Site
Semi - Quantitative Survey Site
Scale
1
2
3
4
5
6

APPENDIX B

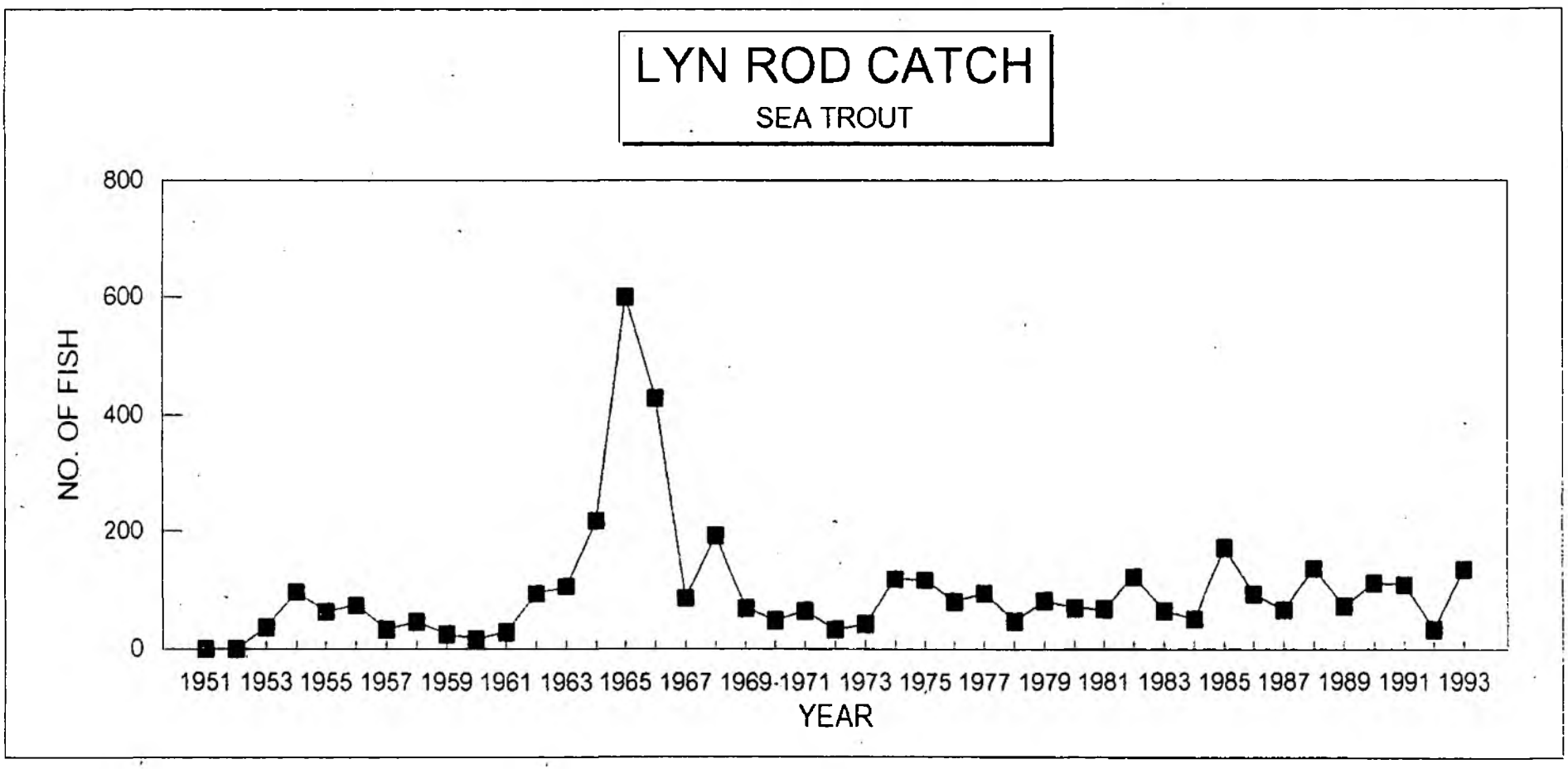
SALMON ROD CATCH

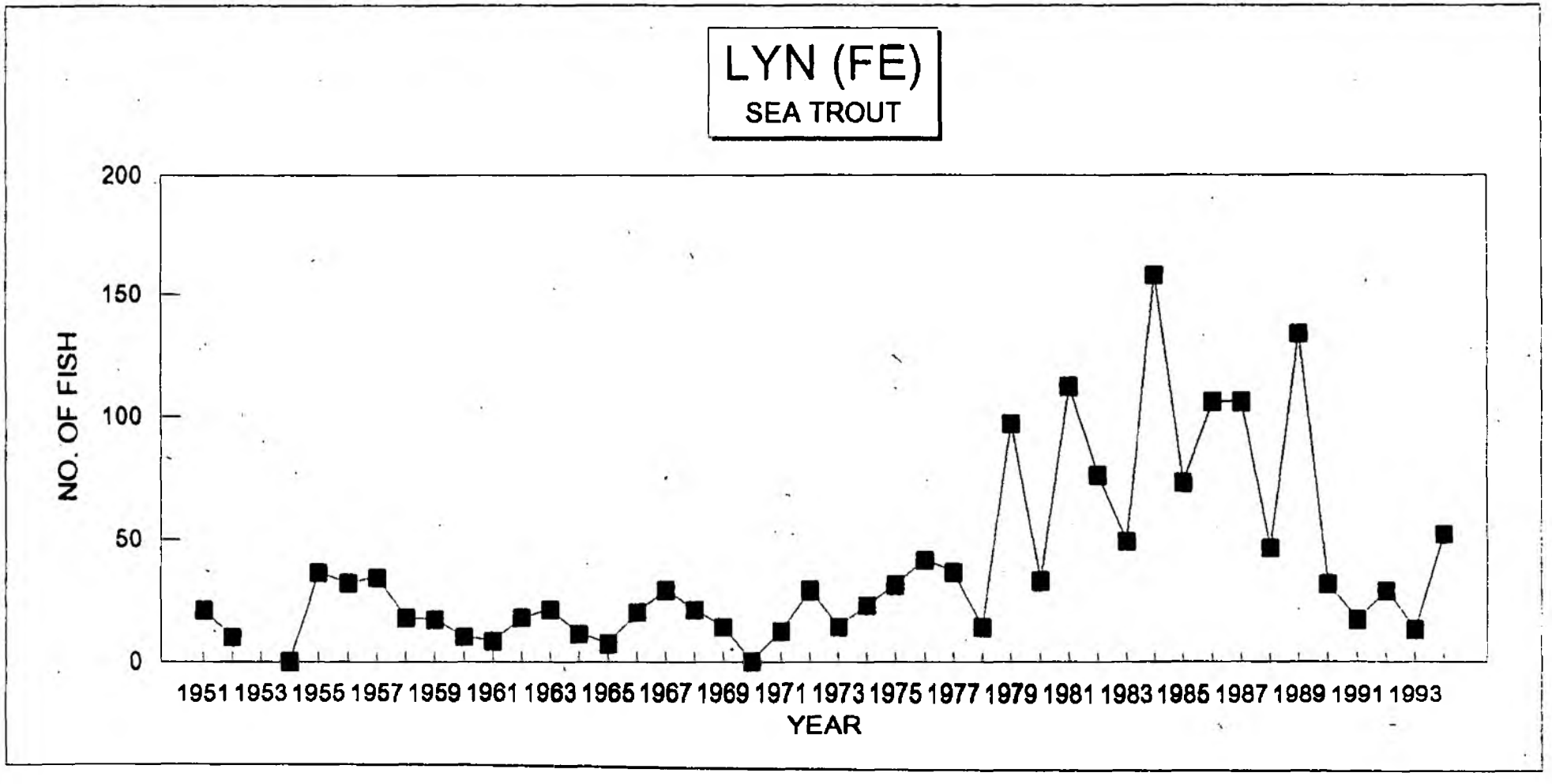

LYN ROD CATCH
SALMON
NO. OF FISH
500
400
300
200
100
0
1951 1953 1955 1957 1959 1961 1963 1965 1967 1969 1971 1973 1975 1977 1979 1981 1983 1985 1987 1989 1991 1993
YEAR


LYN (FE)
SALMON
NO. OF FISH
250
200
150
100
50
0
1951 1953 1955 1957 1959 1961 1963 1965 1967 1969 1971 1973 1975 1977 1979 1981 1983 1985 1987 1989 1991 1993
YEAR

APPENDIX C

SEA TROUT ROD CATCH


LYN ROD CATCH
SEA TROUT
800
600
400
200
0
NO. OF FISH
1951 1953 1955 1957 1959 1961 1963 1965 1967 1969 1971 1973 1975 1977 1979 1981 1983 1985 1987 1989 1991 1993
YEAR


LYN (FE)
SEA TROUT
NO. OF FISH
200
150
100
50
0
1951 1953 1955 1957 1959 1961 1963 1965 1967 1969 1971 1973 1975 1977 1979 1981 1983 1985 1987 1989 1991 1993
YEAR