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ENVIRONMENT
AGENCY

FISHERIES TECHNICAL REPORT

DEVON AREA REPORT
RIVER AVON
FISHERIES SURVEY 1997

DEV/FER/06/98

Author:

Simon Steel
Fisheries Scientist



G R Bateman
Devon Area Manager

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EXECUTIVE SUMMARY

During August 1997 an Electric Fishing Survey was carried out on the River Avon Catchment in which 28 sites were monitored. The strategic fisheries surveys undertaken by the Devon Area Fisheries Science Team provide an indication of the general health of the fishery and highlights areas of juvenile production.

The 1997 Avon Fisheries Survey concluded that salmon fry distribution and abundance had generally increased since 1994. Salmon are now regularly spawning in the Avon and Badworthy Brook upstream of South Brent. Salmon parr abundance was generally similar to that recorded in the 1994 survey. In 1995 adult salmon managed to access the Knapmill Brook. The distribution of trout fry was widespread and their abundance was greater than that recorded in 1994. The distribution of parr and larger trout is consistent with that observed in previous surveys.

RIVER AVON CATCHMENT OVERVIEW FISHERIES REPORT

1.0 INTRODUCTION

1.1 Catchment Overview Objectives

A survey of the distribution and abundance of freshwater fish was conducted throughout the River Avon Catchment at twenty-eight sites during the low flow period of August 1997. The survey was undertaken as part of a 3 year rolling programme to monitor fish stocks in the area. The aim of the survey was to provide a general indication of the health of the catchment in terms of fish stocks, particularly juvenile salmonids.

1.2 Previous Electric Fishing Surveys

Prior to the 1997 survey, the Avon has been surveyed on 5 occasions. The number of sites surveyed before 1991 was very limited, (Tables 3 and 4). Salmonid densities recorded in previous surveys of the catchment are shown in Tables 3 and 4.

1.3 Description of Watercourse

The River Avon rises on South Dartmoor on an upland granite mass. Flowing in a largely southern direction it crosses a geology comprised of slates and grits of the Middle and Lower Devonian Period. It is joined by its two major tributaries the Bala and Glaze Brooks. Becoming tidal upstream of Aveton Gifford, its estuary stretches for more than 6 km, before finally discharging to sea in Bigbury Bay.

The Avon has a catchment area of 341 km², and from its source at Avon Head Mires, 465 metres Above Ordnance Datum, it flows for 33 kms to the sea with an average gradient of 14.1 m/km.

Groundwater resources within the catchment are very limited, as all the rock formations are classified as minor aquifers. There are several surface water abstractions from the Avon and its

tributaries for public water supply and private non-consumptive use.

Land use in the catchment is predominantly agricultural. Hill farming is practised on the high moor while in the mid and lower catchment farming is mainly dairy, beef, sheep and some arable. The middle reaches of the Avon are wooded with both deciduous and coniferous trees. There are two fish farms with M.A.F.F. registration on the Avon, producing largely rainbow trout. In the upper catchment lies Avon Dam which forms a 20 hectare reservoir serving S.W.W.'s South Devon supply network. Parts of the catchment fall within the Dartmoor National Park and also the South Devon Area of Outstanding Natural Beauty.

Records dating from 1971 at Loddiswell Gauging Station on the River Avon show a mean daily flow of 3.54 m³/seconds and a measured Q95 (a flow that is equalled or exceeded 95 % of the time) of 0.41 cumecs, which represents 12% of the mean daily flow. This percentage indicates the minimal contribution that ground water makes to the baseflow in the Avon.

Under the water quality River Ecosystem Classification, water quality in all of the monitored catchment complies with RE1 Class. (see Figure 2 and Figure 3 in Appendix 1).

Table 7. The RE classification scheme

RQO (RE Class)	Class Description
RE1	Water of very good quality suitable for all fish species
RE2	Water of good quality suitable for all fish species
RE3	Water of fair quality suitable for high class coarse fish populations
RE4	Water of fair quality suitable for coarse fish populations
RE5	Water of poor quality which is likely to limit coarse fish populations

1.4 Historical Status as a Fishery

The River Avon supports a modest run of salmon and has a significant sea trout rod fishery. Brown trout are found throughout the catchment. The main rod fishery for salmon and sea trout is concentrated in the Avon from its tidal limit upstream to South Brent. Fishing for non-migratory trout takes place throughout the main river and the natural brown trout fishery in the Avon Dam reservoir is free to holders of an Environment Agency rod licence.

There is no longer a commercial fishery for migratory salmonids on the Avon. One seine net was licenced up until 1979, and a fixed-engine operated in the river until 1983. Seine netting is now prohibited by bye-law, and the Environment Agency holds the rights to operate the fixed engine.

The predominant fisheries issues in recent years are :-

- i) Obstructions to fish migration.
- ii) The impact of land use on the salmonid spawning.
- iii) The lack of suitable salmon spawning areas.
- iv) The impact of fish eating birds.
- v) Inadequate compensation flow from the Avon Dam reservoir

1.5 Rod and Net Catches

Reported rod and net catch details for migratory salmonids are shown in Table 8 below, and illustrated graphically in Appendix 2.

Table 8. Reported rod and net catch details for migratory salmonids.

Species	Rod (1952-96)		Net (1954-79)		Fixed Engine (1954-83)	
	mean	range	mean	range	mean	range
Atlantic salmon	27	2-71	83	0-241	15	0-59
Sea trout	194	61-812	61	0-142	71	0-202

1.6 Spawning

Migratory salmonids spawn in the Avon from the lower reaches upstream as far as Shipley Bridge. The Glaze Brook, Badworthy Brook and Bickham Brook are also well utilised. Brown trout are known to spawn throughout the catchment wherever suitable sized spawning gravels are found. Their requirements are generally for smaller sized gravel than either salmon or sea trout.

2.0 METHODS

2.1.0 Electric fishing surveys

A total of 28 sites were selected throughout the catchment, 24 being surveyed quantitatively and 4 semi-quantitatively. Site location and distribution are shown in Figure 1, and for site detail see Table 1.

Representative reaches were chosen on the basis of geographical distribution, habitat conditions and accessibility. Sites were fished upstream, using a single anode powered by a 240 Volt, 500 Watt bank mounted generator.

2.1.1 Quantitative Surveys

At the quantitative sites a single electric fishing run was performed in a similar manner to the first fishing of a multiple catch depletion (Bird 1995). Single catches were made to further reduce time and cost in fishing each site so that priority could be given to satisfactory cover of the catchment.

All sites were between 50 and 90 metres in length. All salmonids were counted, and fork length measured (to the nearest mm) and identified to species. Precision levels at the quantitative sites were improved by converting catches into density estimates. These conversions were based on the regression relationships between single fishings and depletion estimates (Bird 1996).

The number of other species present was noted, but they were not removed during the electric fishing process. A subjective assessment of numbers of these species was made using the following abundance indicator :-

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

2.1.2 Semi-quantitative Surveys

Wide shallow riffle areas on the middle and lower Avon were sampled by catches per unit time. A single anode was fished for 20 minutes providing presence or absence data, and an indication of stock levels.

All fish were returned to the watercourse unharmed.

3.0 RESULTS

Site details are listed in Table 1. The results for salmonid densities in the 1997 survey are shown in Table 2 and expressed as Number of fish/100m². The presence or absence of salmonid and non salmonid species is given in Table 2 with the estimated population densities for both salmon and trout (fry and parr). Historic salmonid survey data is presented in Tables 3 and 4 to allow comparison with data collected in 1997. Semi-quantitative data is given in Table 5.

4.0 DISCUSSION

4.1.0 Salmon (*Salmo salar*, L.)

4.1.1 Salmon fry (0+)

Salmon fry were recorded at 15 sites during the 1997 survey, and were distributed more widely than in 1993 (Table 3). They were recorded at sites on the Horse Brook and Torr Brook for the first time.

On the River Avon itself, fry were recorded at all sites surveyed as far upstream as Didworthy. Natural rock obstructions at Shipley Bridge upstream of Didworthy preclude access any further, but in the reach downstream of Avon Dam spawning gravels are very limited, so any further access gained would be of little value.

Over 90 percent of quantitative sites containing salmon fry surveyed in 1997 showed increased abundance levels over the 1994 figures. Salmon fry were recorded at eleven sites with a density range of 2.56 - 106.98 fry/100m². In 1994 the density range at the same sites was 0.00 - 18.32 fry/100m².

4.1.2 Salmon parr (1++)

Salmon parr (1++) were recorded at 16 sites in the 1997 survey. Their distribution was broadly similar to 1993 (Table 3), but in 1997 they were caught in the Horse Brook and the Knapmill Brook.

Salmon parr densities at sites on the Avon were broadly similar to those recorded in 1994. It is likely that any decline or increase in abundance at other sites is a natural variation in population. The survey team were surprised to catch parr at Site 25 (Yabbacombe on the Knapmill). The flow at the lower end of the Knapmill Brook is controlled by tidal sluices for flood alleviation purposes, and only under exceptional circumstances can adult salmon access this watercourse. Obviously in the autumn/winter period of 1995/96 adults were able to gain access.

Data collected in 1997 and all historic records show that both fry and salmon parr were absent from the Ashford Stream, Aveton Gifford Stream, Bala Brook and Marridge Stream. Their absence from these streams may be related to the paucity of suitable spawning habitat and problems associated with access for adult salmon.

4.2.0 Trout (*Salmo trutta*, L.)

4.2.1 Trout fry (0+)

Trout fry were recorded at all twenty-eight sites (Table 4) surveyed in 1996. Distribution of this age group of juvenile trout remains virtually unchanged since 1993, when they were absent from only one site, the Knapmill Brook at Yabbacombe.

Fry abundance throughout the catchment at quantitative survey sites was greater than that found in 1994 and exceeded any levels recorded in the 1991 survey. The Badworthy Brook, Bickham Brook, Cocks Brook and Torr Brook all returned fry densities well in excess of any previously recorded figures. Levels of trout fry abundance on the Avon and Bala Brook by comparison appear much lower. This may be a reflection on the lack of suitable sized spawning gravels and restricted migratory trout access.

Assessing trout production in the Avon system is complicated by the presence of sea trout. It is not possible to differentiate between juvenile brown trout and sea trout, so the contribution made to the stocks by migratory trout is unknown. It is very likely that the elevated levels of 0+ trout at many sites observed in the 1997 Survey are the result of sea trout spawning, which have enhanced natural brown trout stocks.

4.2.2 Trout Parr (1++)

Trout parr and larger trout were recorded at all sites surveyed in 1997 (Table 4). Distribution remains unchanged since the 1994 survey. Abundance levels of this age group of trout show no significant change from 1994. It is likely that a proportion of the trout parr caught during the survey will form a component of the sea trout population in the catchment, so it is difficult to evaluate any changing trends in the brown trout population.

Following the 1994 Survey, the depressed fish population at Yabbacombe on the Knapmill Brook was reported to the N.R.A.'s Water Quality Section. Investigation identified a water quality problem a short distance upstream of the survey site. The 1997 survey showed that this section of stream has been recolonised by not only trout but also surprisingly as mentioned earlier juvenile salmon.

4.3 Stocked Salmonids

There are no records of trout have been stocked into the Avon catchment in recent years. The Environment Agency's policy regarding stocking is to generally discourage the introduction of any fish farm bred stock that might dilute the river's natural gene pool and compete with the native stocks for food and habitat.

4.4 Adult Sea trout

Sea trout were encountered at Sites 4, 5, 6 and 7 on the Avon during the 1997 survey. No significance is attached to their presence during the juvenile salmonid surveys, as migration time and flow conditions can dictate their presence or absence at a survey site during their upstream

journey and can change on a day to day basis.

4.5 Other species

Six non-salmonid species were recorded during the 1997 survey and are given below :-

Bullhead, *Cottus gobio*, L.

Eel, *Anguilla anguilla*, L.

Minnow, *Phoxinus phoxinus*, L.

Stone loach, *Noemacheilus barbatulus*, L.

Lamprey, *Lampetra fluviatilis*, L.

Flounder, *Platichthys flesus*, L.

Eels were recorded at all but two sites at the top of the Avon and the top site on the Bala Brook. Bullheads were the second most distributed species, followed by stone loach. Minnows were restricted to mid and lower Avon and on the Knapmill Brook. The diversity of these species in the catchment generally declined in an upstream direction, which is a feature common with most rivers in Devon.

The presence and/or absence of all species found at each site within the catchment are shown in the River Avon Distribution Maps in Appendix 3.

5.0 CONCLUSIONS

- i) Salmon fry distribution and abundance has generally increased since 1994.
- ii) Salmon are now regularly spawning in the Avon and Badworthy Brook upstream of South Brent
- iii) Overall salmon parr abundance was consistent with that recorded in 1994.

- iv) Trout fry were caught at all sites during the 1997 survey.
- v) Trout fry densities were generally recorded at higher levels than in 1994.
- vi) The distribution of parr and larger trout is consistent with that observed in previous surveys.

6.0 RECOMMENDATIONS

- i) Continue to monitor the Avon Catchment on a three yearly programme, as part of the national strategic survey.
- ii) Survey tributaries for any obstructions to fish passage and seek to improve conditions for migration where practicable.
- iii) Survey salmonid spawning and nursery habitats and implement improvements where appropriate.

7.0 REFERENCES

D.J. BIRD, 1996 Reporting Guidelines for Fisheries Catchment Overview Surveys.

D.J. BIRD, 1996 The Use of Cost Effective Single Catch Electric Fishing Methods in the Routine Monitoring of Juvenile Salmonids.

GOODWILL J. 1994 River Avon Fisheries Survey. N.R.A.

8.0 ACKNOWLEDGEMENTS

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To the Fisheries Technicians D. Hoskin and A. Bailey for organising fieldwork, processing and collation of data.

To Survey Assistant Mike Garforth for his help with the fieldwork and data processing.

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APPENDIX 2	SALMON ROD CATCH (1974-1996)
	SEA TROUT ROD CATCH (1974-1996)
	SALMON NET & FIXED ENGINE CATCH (1951-1983)
	SEA TROUT NET & FIXED ENGINE CATCH (1951-1983)

APPENDIX 3	FISH DISTRIBUTION MAPS OF SPECIES PRESENT WITHIN THE AVON CATCHMENT
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APPENDIX 1

TABLE 1 - SITE DETAIL SHEET

TABLE 2 - SUMMARY SHEET

TABLE 3 - ALL SURVEYS 1962-1997 SALMON DENSITIES

TABLE 4 - ALL SURVEYS 1962-1997 TROUT DENSITIES

TABLE 5 - SEMI-QUANTITATIVE DATA

TABLE 6 - OTHER SPECIES ABUNDANCE

FIGURE 1 - SITE DISTRIBUTION MAP

FIGURE 2 - 1996 PROPOSED RIVER QUALITY OBJECTIVES
(RIVER ECOSYSTEM CLASSIFICATION)

FIGURE 3 - 1996 COMPLIANCE WITH PROPOSED RIVER QUALITY OBJECTIVES
(RIVER ECOSYSTEM CLASSIFICATION)

TABLE 1**RIVER AVON SITE DETAIL SHEET 1997**

WATERCOURSE	SITE No.	SITENAME	N.G.R
AVON	1	Avon Dam Bridge	SX 680 648
	2	Wooleshole Bridge	SX 681 687
	3	Didworthy	SX 685 620
	4	D/S A38 Road Bridge	SX 698 593
	5	Avonwick St.	SX 717 594
	6	\$ Bickham Bridge	SX 726 555
	7	U/s Gara Bridge	SX 729 536
	8	\$ D/s Topsham Bridge	SX 732 511
	9	\$ U/s Hatchbridge	SX 716 473
	10	\$ Knap Mill 1	SX 709 473
BALA BROOK	11	Old Hill Settlement	SX 671 629
	12	D/s Zeal Bridge	SX 679 625
BADWORTHY BROOK	13	Badworthy Bridge	SX 685 617
GLAZEBROOK	14	U/s Owley Bridge	SX 677 600
	15	Avonwick Mill	SX 687 589
HORSEBROOK	16	Horsebrook	SX 710 587
BICKHAM BROOK	17	Higher Ford	SX 704 560
	18	Bickham House	SX 724 555
MARRIDGE STREAM	19	Marridge	SX 719 546
COCKS BROOK	20	U/s Newhouse	SX 742 534
	21	Fir Plantation	SX 733 533
TORR BROOK	22	Coldharbour	SX 746 497
	23	Commill	SX 733 484
KNAPMILL BROOK	24	Aileron	SX 709 498
	25	Yabbacombe	SX 708 478
AVETON GIFFORD STREAM	26	Aveton Gifford	SX 693 479
ASHFORD STREAM	27	Ashford	SX 688 487
CHALLONS COMBE STREAM	28	Easton	SX 677 474

KEY

\$ = Semi Quantitative site

<u>DATE</u>	<u>LENGTH M</u>	<u>MEAN WIDTH M</u>	<u>WETTED AREA M²</u>	<u>WATER TEMP °C</u>	<u>CONDUCTIVITY µ/Cm</u>
14.08.97	63	7.50	472.50	15.3	36.3
14.08.97	73	6.72	490.56	16.2	38.8
18.08.97	60	7.82	469.38	16.1	45.2
18.08.97	68	7.97	541.96	16.4	102.8
12.08.97	90	9.49	854.10	15.9	107.3
20.08.97	-	11.50	-	16.9	127.0
21.08.97	75	9.99	749.25	17.3	152.4
20.08.97	-	12.73	-	18.8	156.0
20.08.97	-	10.10	-	19.3	176.8
21.08.97	-	10.00	-	18.7	179.4
14.08.97	55	3.93	216.15	16.5	42.0
11.08.97	50	4.55	227.50	15.7	45.3
05.08.97	64	2.23	142.72	13.8	94.0
11.08.97	85	4.00	340.00	15.0	61.2
11.08.97	65	4.54	295.10	14.5	112.1
12.08.97	75	1.81	135.75	15.0	335.0
05.08.97	78	2.37	184.86	14.3	328.0
20.08.97	87	2.04	177.48	16.6	345.0
05.08.97	50	1.87	93.50	15.1	388.0
21.08.97	70	1.90	133.00	18.0	257.0
07.08.97	75	2.15	161.25	16.9	257.0
13.08.97	58	2.76	160.08	16.0	330.0
13.08.97	67	3.26	218.42	15.8	317.0
08.08.97	80	2.46	196.80	15.0	303.0
07.08.97	68	2.49	169.32	16.4	340.0
12.08.97	67	1.58	105.86	16.9	395.0
08.08.97	84	2.12	178.08	17.0	405.0
13.08.97	77	2.09	160.93	17.3	406.0

TABLE 2**RIVER AVON SUMMARY SHEET 1997**

RIVER	SITE NO	SITE NAME	N.G.R
AVON	1	Avon Dam Bridge	SX 680 648
	2	Wooleshole Bridge	SX 681 687
	3	Didworthy	SX 685 620
	4	D/s A38 Road Bridge	SX 698 593
	5	Avonwick St.	SX 717 594
	6	\$ Bickham Bridge	SX 726 555
	7	U/s Gara Bridge	SX 729 536
	8	\$ D/s Topsham Bridge	SX 732 511
	9	\$ U/s Hatchbridge	SX 716 473
	10	\$ Knap Mill	SX 709 473
BALABROOK	11	Old Hill Settlement	SX 671 629
	12	D/s Zeal Bridge	SX 679 625
BADWORTHY BROOK	13	U/s Badworthy Bridge	SX 685 617
GLAZEBROOK	14	U/s Owley Bridge	SX 677 600
	15	Avonwick Mill	SX 687 589
HORSEBROOK	16	Horsebrook	SX 710 587
BICKHAM BROOK	17	Higher Ford	SX 704 560
	18	Bickham House	SX 724 555
MARRIDGE STREAM	19	Marridge	SX 719 546
COCKS BROOK	20	U/s Newhouse	SX 742 534
	21	Fir Plantation	SX 733 533
TORR BROOK	22	Coldharbour	SX 746 497
	23	Cornmill	SX 733 484
KNAPMILL BROOK	24	Alleron	SX 709 498
	25	Yabbacombe	SX 708 478
AVETON GIFFORD STREAM	26	Aveton Gifford	SX 693 479
ASHFORD STREAM	27	Ashford	SX 688 487
CHALLONS COMBE STREAM	28	Easton	SX 677 474

KEY

\$ - Semi - Quantitative site
 # - Species Present
 @ - Species absent

M - Minnow
 B - Bullhead
 E - Eel

SALMON DENSITY (100 m²)FRY PARR

0.00 0.00

0.00 0.00

2.56 2.77

9.59 2.99

26.62 6.84

#

29.04 3.87

#

#

#

0.00 0.00

0.00 0.00

35.82 4.52

19.70 0.66

6.51 1.21

19.74 1.30

0.00 0.00

106.98 1.89

0.00 0.00

0.00 0.00

2.15 2.06

0.00 0.00

8.10 0.00

0.00 0.00

0.00 7.70

0.00 0.00

0.00 0.00

0.00 4.00

TROUT DENSITY (100 m²)FRY PARR

9.05 22.98

1.98 12.00

10.57 5.54

9.46 4.83

6.63 4.62

#

2.48 2.78

#

#

#

3.31 16.94

3.16 16.09

70.70 38.42

44.25 18.27

12.19 14.56

19.13 12.89

87.34 3.63

88.98 16.14

14.71 8.55

12.89 17.96

58.58 13.81

66.24 32.11

35.72 27.87

40.79 23.54

1.31 15.03

49.33 16.54

41.09 24.23

14.96 19.81

OTHER SPECIES

E

B,E,ST

B,E,M,ST

B,E,M,SL,ST

B,E,SL,ST.

B,E,SL.

B,E,M,SL.

B,E,M,SL.,FL

@

E.

E.

E.

B,E.

B,E.

B,E,SL.

B,E,SL,L.

B,E,SL.

E,SL.

E,SL.

B,E,SL,L.

B,E.

B,E.

B,E,M,SL.

E.

B,E,SL.

B,E.

L - Lamprey
F - Flounder
SL - Stone Loach

ST - Sea Trout

TABLE 3

RIVER AVON - ALL SURVEYS 1962 - 1997

SALMON DENSITY (100 m²)

WATERCOURSE	SITE NAME	SALMON FRY (0+)						SALMON PARR (1+) AND OLDER					
		1962	1978	1984	1991	1994	1997	1962	1978	1984	1991	1994	1997
AVON	Avon Dam Bridge	@	-	-	0.00	0.00	0.00	@	0.00	-	0.00	0.00	0.00
	Woolholes Bridge	@	-	-	0.00	0.00	0.00	@	-	-	0.00	0.00	0.00
	Shipley Bridge	-	-	-	-	-	-	-	0.00	-	-	-	-
	Didworthy	@	-	-	0.00	1.28	2.56	@	-	-	0.00	2.75	2.77
	Lydia Bridge	-	-	-	-	-	-	-	28.50	-	-	-	-
	Island Weir	-	-	-	-	-	-	-	58.25	-	-	-	-
	Brent Mill Bridge	-	-	-	-	-	-	-	18.81	-	-	-	-
	Bridge Farm	#	-	-	-	-	-	#	-	-	-	-	0.00
	D/S A38 Bridge	-	-	-	-	7.71	9.59	-	-	-	-	5.72	2.99
	Avonwick St.	-	-	-	21.38	15.05	28.82	-	-	-	13.59	4.57	8.84
	Brushford Bridge	#	-	-	-	-	-	#	-	-	-	-	-
	Bickham Bridge	-	-	-	25.29	#	#	-	-	-	5.39	#	#
	U/s Gara Bridge	-	-	-	39.05	18.32	29.04	-	-	-	8.59	4.76	3.87
	D/s Topsham Bridge	#	-	-	20.49	#	#	#	-	-	7.79	#	#
	U/s Hatchbridge	-	-	-	7.20	#	#	-	-	-	1.15	#	#
	Knap Mill (1)	#	-	-	#	#	#	#	-	-	#	#	#
	Knap Mill (2)	-	-	-	#	-	-	-	-	-	#	-	-
	Knap Mill (3)	-	-	-	#	-	-	-	-	-	#	-	-
BALA BROOK	Old Hill Settlement	-	-	-	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00
	D/s Zeal Bridge	@	-	-	0.00	0.00	0.00	@	-	-	0.00	0.00	0.00
BADWORTHY BROOK	U/s Badworthy Bridge	-	-	-	0.00	9.81	35.82	-	-	-	5.73	22.44	4.52
GLAZE BROOK	Tin Stream	-	-	0.00	-	-	-	-	-	0.00	-	-	-
	Wishing Pool	-	-	0.00	-	-	-	-	-	0.00	-	-	-
	Dingy Grove	-	-	0.00	-	-	-	-	-	0.00	-	-	-
	Owley Bottom	-	-	0.00	-	-	-	-	-	0.00	-	-	-
	U/s Owley Bridge	-	-	-	0.00	0.00	19.70	-	-	-	0.00	0.00	0.68
	Pennaton Copse	-	-	0.00	-	-	-	-	-	0.00	-	-	-
	Avonwick Mill	-	-	-	12.39	3.19	6.51	-	-	-	6.35	2.32	1.21
	Glazebrook Weir	#	-	-	-	-	-	#	1.56	-	-	-	-
HORSE BROOK	Horsebrook	-	-	-	0.00	0.00	19.74	-	-	-	0.00	0.00	1.30
BICKHAM BROOK	Higher Ford	-	-	-	0.00	2.14	0.00	-	-	-	0.00	0.00	0.00
	Bickham House	-	-	-	41.10	8.47	106.98	-	-	-	10.88	6.72	1.69
MARRIDGE STREAM	Maridge	-	-	-	-	0.00	0.00	-	-	-	-	0.00	0.00
COCKS BROOK	U/s New House	-	-	-	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00
	Fir Plantation	-	-	-	1.39	1.39	2.15	-	-	-	0.46	4.66	2.06
TORR BROOK	Coldharbour Wood	-	-	-	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00
	Commill	-	-	-	0.00	0.00	8.10	-	-	-	0.00	0.00	0.00
KNAPMILL BROOK	Allerton	-	-	-	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00
	Yabbacombe	-	-	-	0.00	0.00	0.00	-	-	-	0.00	0.00	7.70
AVETON GIFFORD STREAM	Aveton Gifford	-	-	-	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00
ASHFORD STREAM	Ashford	-	-	-	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00
CHALLONS COMBE STREAM	Easton	-	-	-	-	0.00	0.00	-	-	-	-	0.68	4.00

KEY SEMI-QUANTITATIVE DATA : # = SPECIES PRESENT @ = SPECIES ABSENT

WATERCOURSE

SITE NAME

TROUT ERY (Q+)

1982

1978

1984

1991

AVON

Avon Dam Bridge

#

-

-

2.09

Woolholes Bridge

#

-

-

0.18

Shipley Bridge

-

-

-

-

Didworthy

#

-

-

4.11

Lydia Bridge

-

-

-

-

Island Weir

-

-

-

-

Brent Mill Bridge

-

-

-

-

Bridge Farm

#

-

-

-

D/S A38 Road Bridge

-

-

-

-

Avonwick St.

-

-

-

8.45

Brushford Bridge

#

-

-

-

Bickham Bridge

-

-

-

3.12

U/s Gara Bridge

-

-

-

7.72

D/s Topsham Bridge

#

-

-

8.88

U/s Hatchbridge

-

-

-

1.94

Knap Mill (1)

#

-

-

#

Knap Mill (2)

-

-

-

#

Knap Mill (3)

-

-

-

#

BALA BROOK

Old Hill Settlement

-

-

-

0.91

D/s Zeal Bridge

#

-

-

2.14

BADWORTHY BROOK

U/s Badworthy br

-

-

-

48.32

GLAZE BROOK

Tin Stream

-

-

0.00

-

Wishing Pool

-

-

10.68

-

Dingy Grove

-

-

31.08

-

Owley Bottom

-

-

25.37

-

U/s Owley Bridge

-

-

-

30.31

Pennaton Copse

-

-

10.15

-

Avonwick Mill

-

-

-

7.86

Glazebrook Weir

00

-

-

-

HORSE BROOK

Horsebrook

-

-

-

11.23

BICKHAM BROOK

Higher Ford

-

-

-

21.71

Bickham House

-

-

-

70.72

MARRIDGE STREAM

Marridge

-

-

-

-

COCKS BROOK

U/s New House

-

-

-

1.27

Fir Plantation

-

-

-

21.73

TORR BROOK

Coldharbour Wood

-

-

-

10.19

Commill

-

-

-

16.14

KNAPMILL BROOK

Allerton

-

-

-

0.00

Yabbacombe

-

-

-

17.12

AVETON GIFFORD STREAM

Aveton Gifford

-

-

-

20.70

ASHFORD STREAM

Ashford

-

-

-

1.45

CHALLONS COMBE STREAM

Easton

-

-

-

-

KEY

SEMI-QUANTITATIVE DATA :- # =

TROUT PARR (1+ AND OLDER)

1984	1997	1982	1978	1984	1991	1994	1997
3.31	9.05	#	23.35	-	17.44	14.48	22.98
0.38	1.88	#	-	-	3.57	11.08	12.00
-	-	-	14.58	-	-	-	-
3.48	10.57	#	-	-	9.59	10.09	5.54
-	-	-	35.50	-	-	-	-
-	-	-	23.21	-	-	-	-
-	-	-	17.50	-	-	-	-
-	-	#	-	-	-	-	-
5.97	9.46	-	-	-	-	14.04	4.83
1.84	6.63	-	-	-	7.79	3.43	4.62
-	-	#	-	-	-	-	-
#	#	-	-	-	3.35	#	#
2.10	2.48	-	-	-	5.10	3.92	2.78
#	#	#	-	-	4.23	#	#
#	#	-	-	-	0.58	#	#
#	#	#	-	-	#	#	#
-	-	-	-	-	#	-	-
-	-	-	-	-	#	-	-
1.57	3.31	-	-	-	17.36	32.25	18.94
2.68	3.16	#	-	-	10.72	20.43	18.09
13.02	70.70	-	-	-	28.21	43.03	38.42
-	-	-	-	7.14	-	-	-
-	-	-	-	22.33	-	-	-
-	-	-	-	44.59	-	-	-
-	-	-	-	19.90	-	-	-
29.72	44.25	-	-	-	18.70	34.27	16.27
-	-	-	-	13.53	-	-	-
5.22	12.19	-	-	-	14.58	13.04	14.58
-	-	#	54.69	-	-	-	-
5.98	19.13	-	-	-	3.30	5.81	12.89
9.23	87.34	-	-	-	0.52	1.38	3.63
15.33	88.98	-	-	-	18.13	18.47	16.14
27.34	14.71	-	-	-	-	0.68	8.55
1.17	12.89	-	-	-	10.16	13.21	17.96
15.28	58.58	-	-	-	2.77	13.19	13.81
12.65	66.24	-	-	-	8.73	23.11	32.11
13.01	35.72	-	-	-	16.89	29.49	27.87
10.42	40.79	-	-	-	4.51	22.41	23.54
0.00	1.31	-	-	-	0.00	0.92	15.03
16.80	49.33	-	-	-	2.30	11.55	16.54
1.88	41.09	-	-	-	2.18	10.60	24.23
2.42	14.96	-	-	-	-	18.66	19.81

SPECIES PRESENT @ = SPECIES ABSENT

TABLE 5

RIVER AVON FISH SURVEY SEMI - QUANTITATIVE RESULTS**1994 RESULTS**

<u>WATERCOURSE</u>	<u>SITE NAME</u>	<u>N G R</u>	<u>0+</u>	<u>SALMON</u> <u>1+ AND OLDER</u>	<u>0+</u>	<u>TROUT</u> <u>1+ AND OLDER</u>	<u>OTHER</u> <u>SPECIES</u>
AVON	U/s Bickham Bridge	SX 726 - 555	65	21	4	10	B,E,SL,ST
AVON	D/s Topsham Bridge	SX 732 - 511	11	16	7	3	B,E,SL,ST
AVON	U/S Hatch Bridge	SX 716 - 473	7	1	3	2	B,E,SL,ST,MW,ST
AVON	Knap Mill	SX 709 - 473	33	8	6	5	B,E,FL,MW,SL

1997 RESULTS

<u>WATERCOURSE</u>	<u>SITE NAME</u>	<u>N G R</u>	<u>0+</u>	<u>SALMON</u> <u>1+ AND OLDER</u>	<u>0+</u>	<u>TROUT</u> <u>1+ AND OLDER</u>	<u>OTHER</u> <u>SPECIES</u>
AVON	U/s Bickham Bridge	SX 726 - 555	87	18	10	5	B,E,MW,SL,ST
AVON	D/s Topsham Bridge	SX 732 - 511	49	20	5	4	B,E,SL
AVON	U/S Hatch Bridge	SX 716 - 473	75	17	21	2	B,E,MW,SL
AVON	Knap Mill	SX 709 - 473	9	3	3	1	B,E,MW,SL,FL

KEY

B = Bullhead
E = Eel
FL = Flounder

MW = Minnow
SL = Stoneloach
ST = Seatrout

TABLE 6

RIVER AVON CATCHMENT - TABLE OF OTHER SPECIES ABUNDANCE 1997

WATERCOURSE	SITE No.	SITE NAME	N.G.R	Bullhead	Eel	Lamprey	Minnow	Stoneloach	Flounder
AVON	1	Avon Dam Bridge	SX 680 648	-	-	-	-	-	-
	2	Wooleshole Bridge	SX 681 637	-	-	-	-	-	-
	3	Didworthy	SX 685 620	-	P	-	-	-	-
	4	D/S A38 Road Bridge	SX 698 593	C	C	-	-	-	-
	5	Avonwick St..	SX 717 574	C	C	-	C	-	-
	6	\$ Bickham Bridge	SX 726 555	C	P	-	C	C	-
	7	U/s Gara Bridge	SX 729 536	A	C	-	-	C	-
	8	\$ D/s Topsham Bridge	SX 732 511	C	C	-	-	C	-
	9	\$ U/s Hatchbridge	SX 716 473	C	C	-	C	C	-
	10	\$ Knap Mill 1	SX 709 473	C	A	-	C	P	P
BALABROOK	11	Old Hill Settlement	SX 671 629	-	-	-	-	-	-
	12	D/s Zeal Bridge	SX 679 625	-	P	-	-	-	-
BADWORTHY BROOK	13	Badworthy Bridge	SX 685 617	-	P	-	-	-	-
GLAZEBROOK	14	U/s Owley Bridge	SX 677 600	-	C	-	-	-	-
	15	Avonwick Mill	SX 687 593	C	C	-	-	-	-
HORSEBROOK	16	Horsebrook	SX 710 587	C	C	-	-	-	-
BICKHAM BROOK	17	Higher Ford	SX 704 560	A	P	-	-	P	-
	18	Bickham House	SX 724 555	C	C	P	-	C	-
MARRIDGE STREAM	19	Marridge	SX 719 546	C	P	-	-	P	-
COCKS BROOK	20	U/s Newhouse	SX 742 534	-	P	-	-	P	-
	21	Fir Plantation	SX 733 533	-	C	-	-	C	-
TORR BROOK	22	Coldharbour	SX 746 497	C	C	P	-	C	-
	23	Cornmill	SX 733 484	C	C	-	-	-	-
KNAPMILL BROOK	24	Alleron	SX 709 498	C	C	-	-	-	-
	25	Yabbacombe	SX 708 478	A	C	-	P	C	-
AVETON GIFFORD STREAM	26	Aveton Gifford	SX 693 479	-	C	-	-	-	-
ASHFORD STREAM	27	Ashford	SX 688 487	C	C	-	-	P	-
CHALLONS COMBE STREAM	28	Easton	SX 677 474	C	C	-	-	-	-

Key

P = Present (1-10)

C = Common (11- 100)

A = Abundant (>100)

\$ = Semi - Quantitative site

Figure 1

RIVER AVON ELECTRIC FISHING SITES 1997

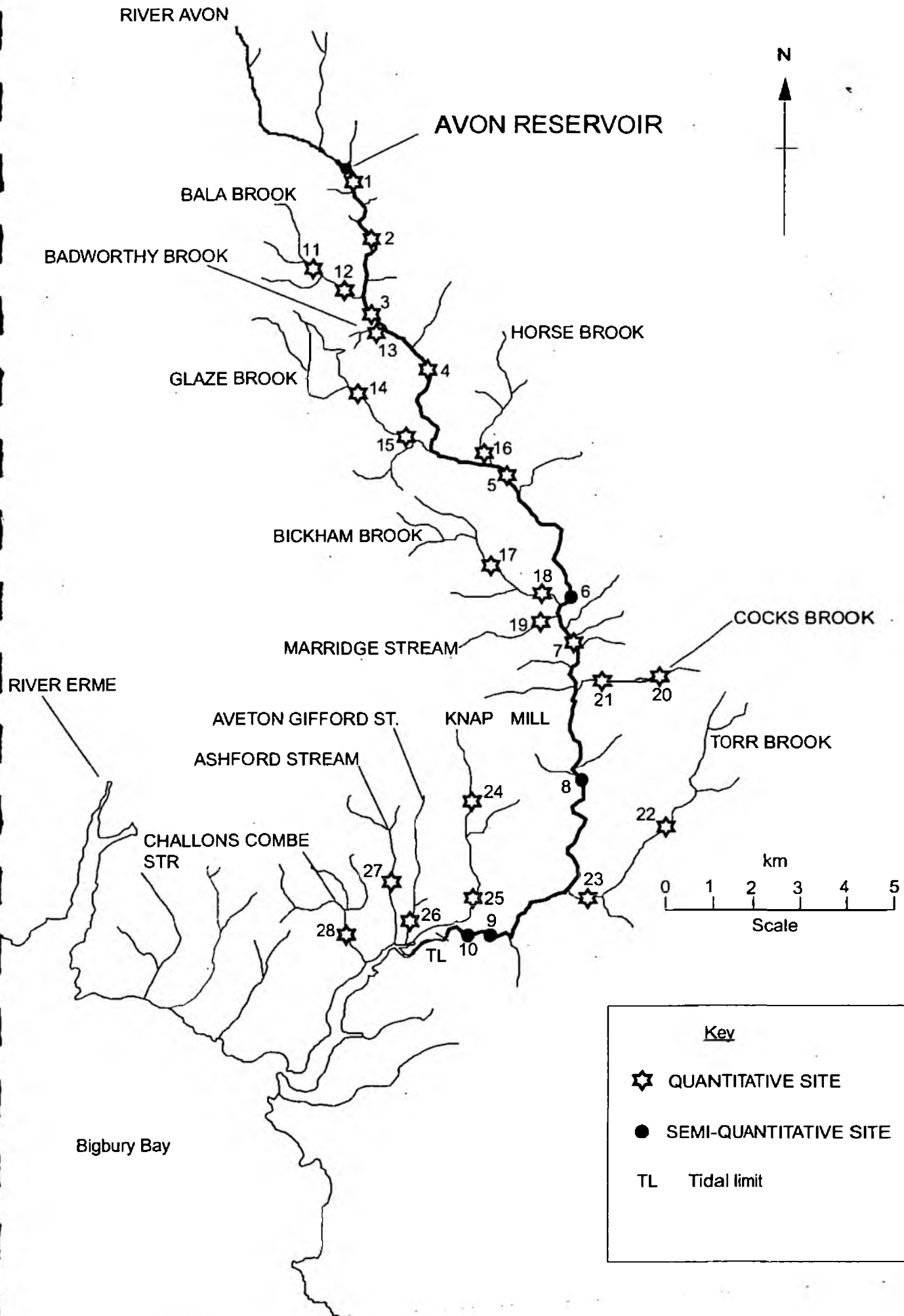


Fig 2 - Proposed River Quality Objectives (River Ecosystem Classification)

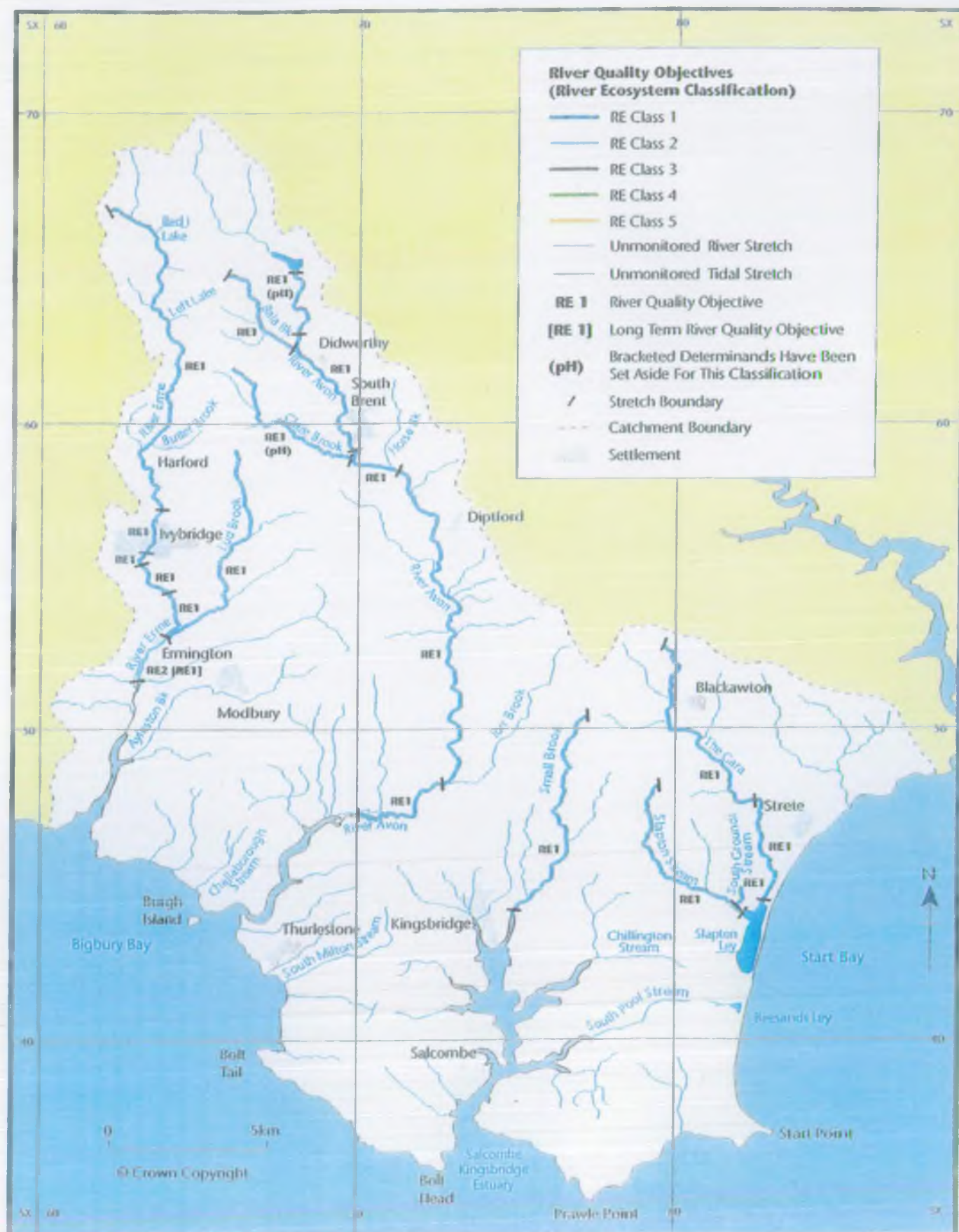
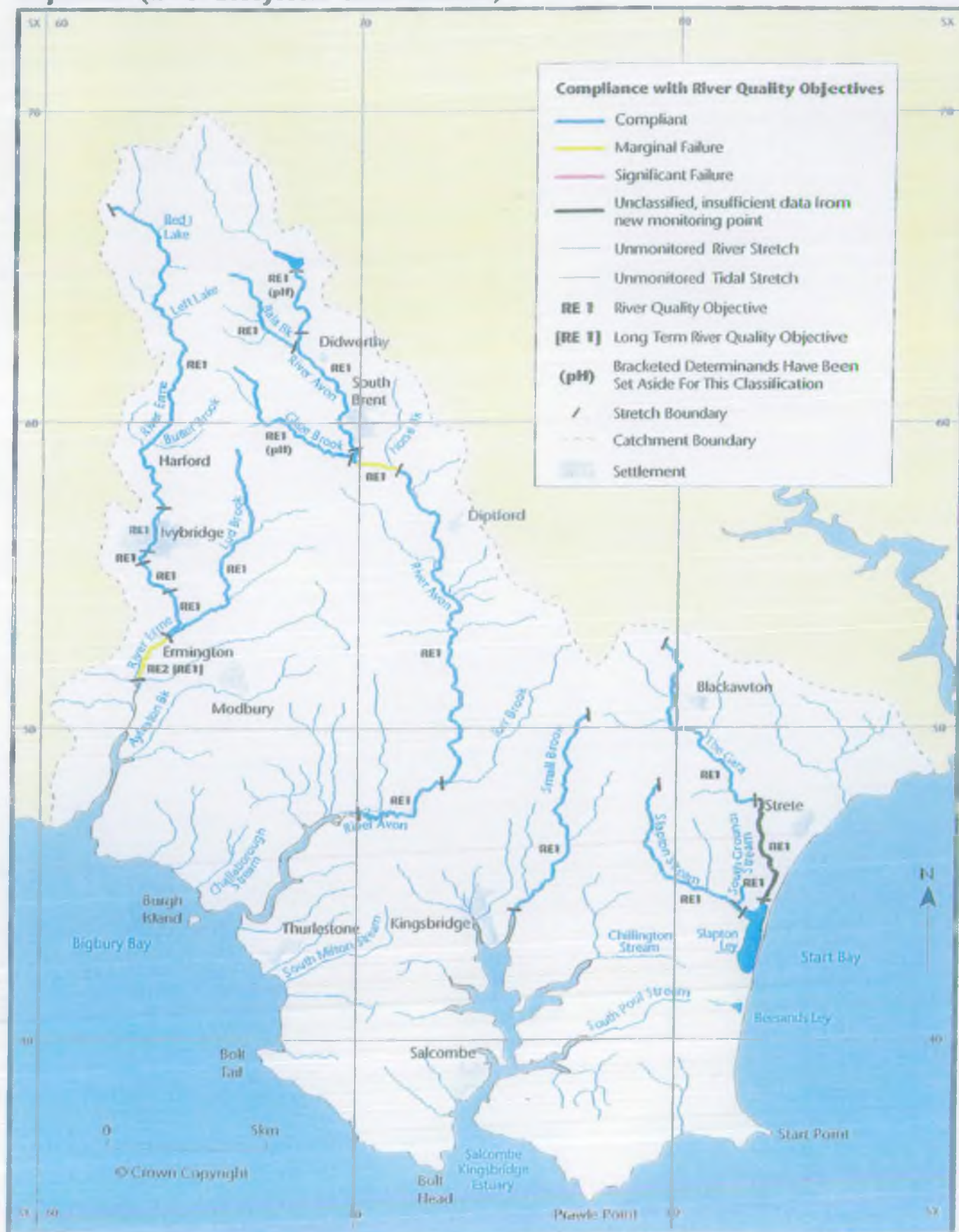


Fig 3 - 1996 Compliance with proposed River Quality Objectives (River Ecosystem Classification)



APPENDIX 2

SALMON ROD CATCH (1974-1996)

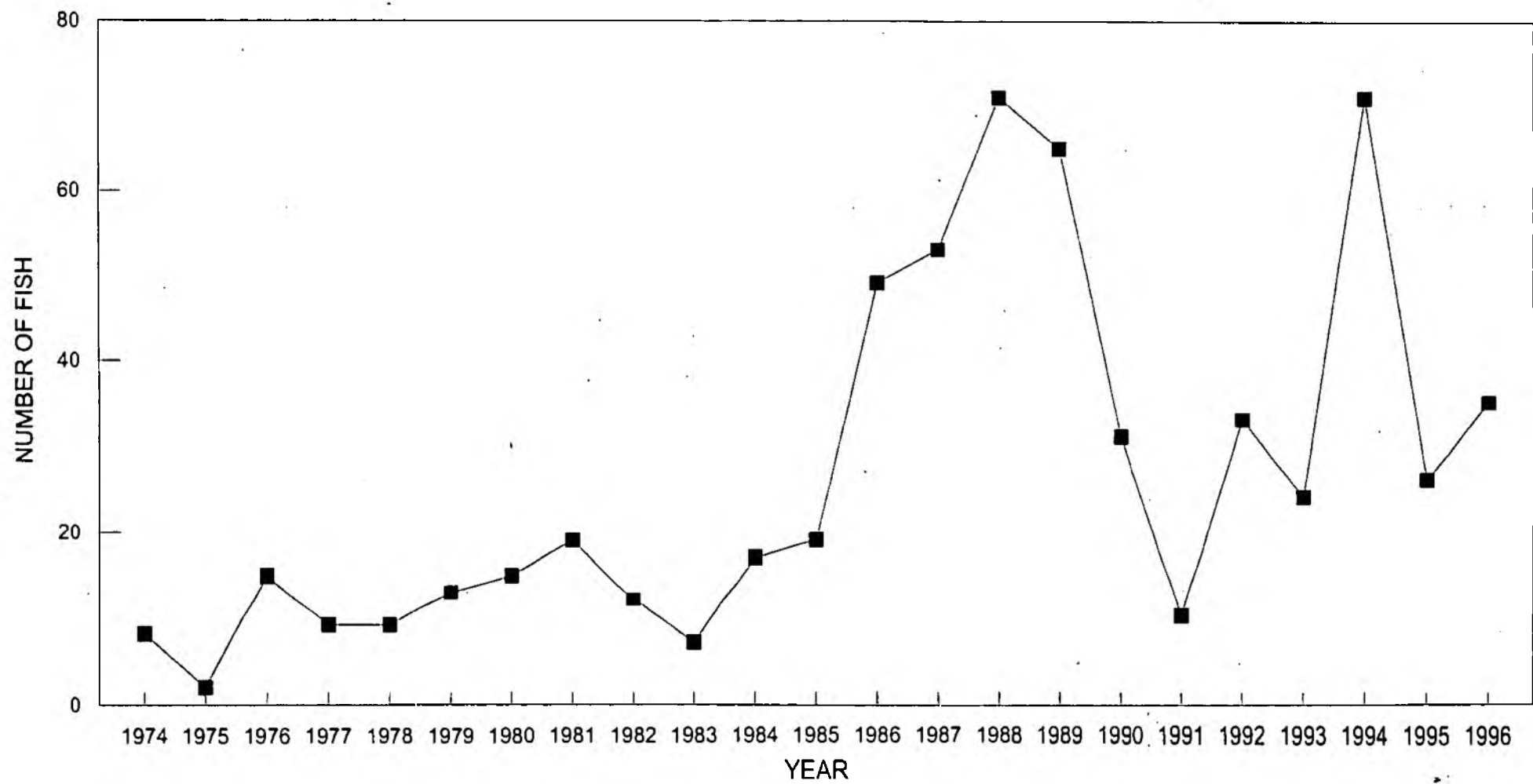
SEA TROUT ROD CATCH (1974-1996)

SALMON NET & FIXED ENGINE CATCH (1951-1983)

SEA TROUT NET & FIXED ENGINE CATCH (1951-1983)

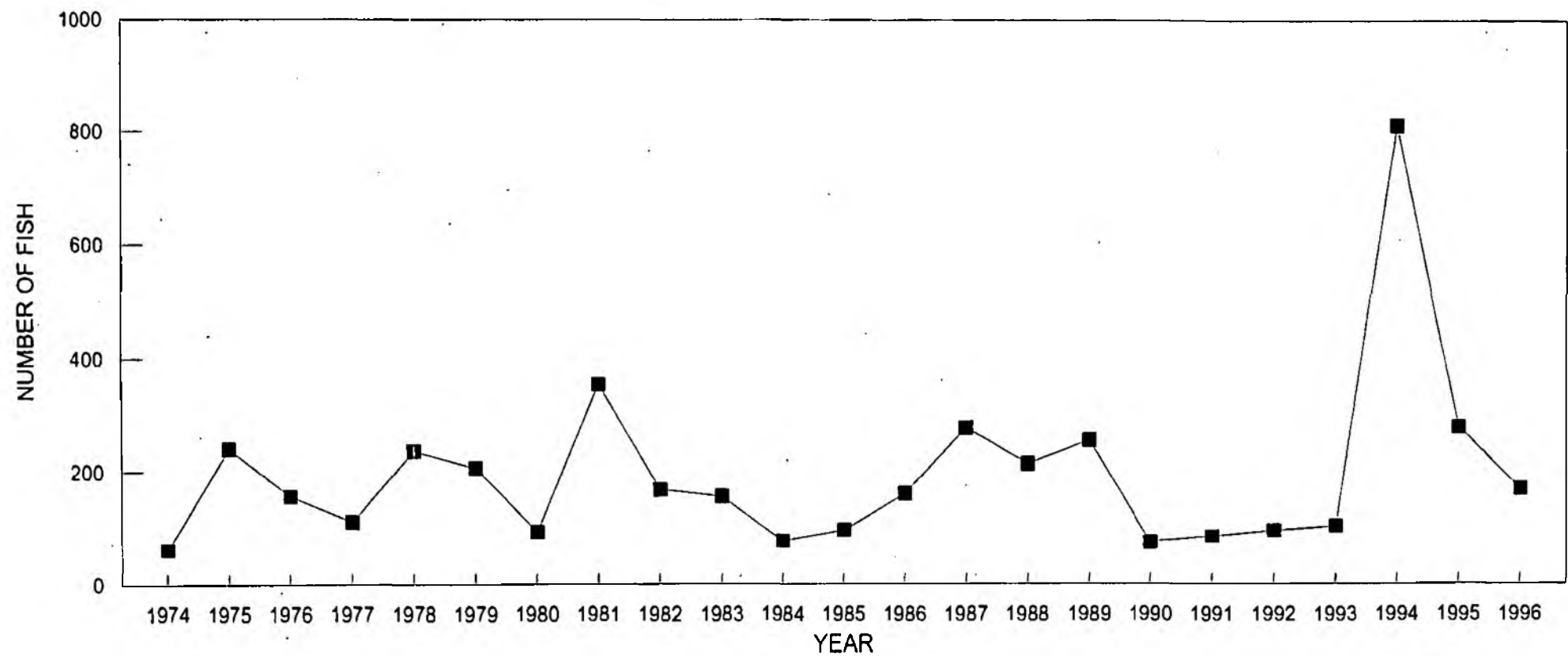
AVON ROD CATCH

SALMON



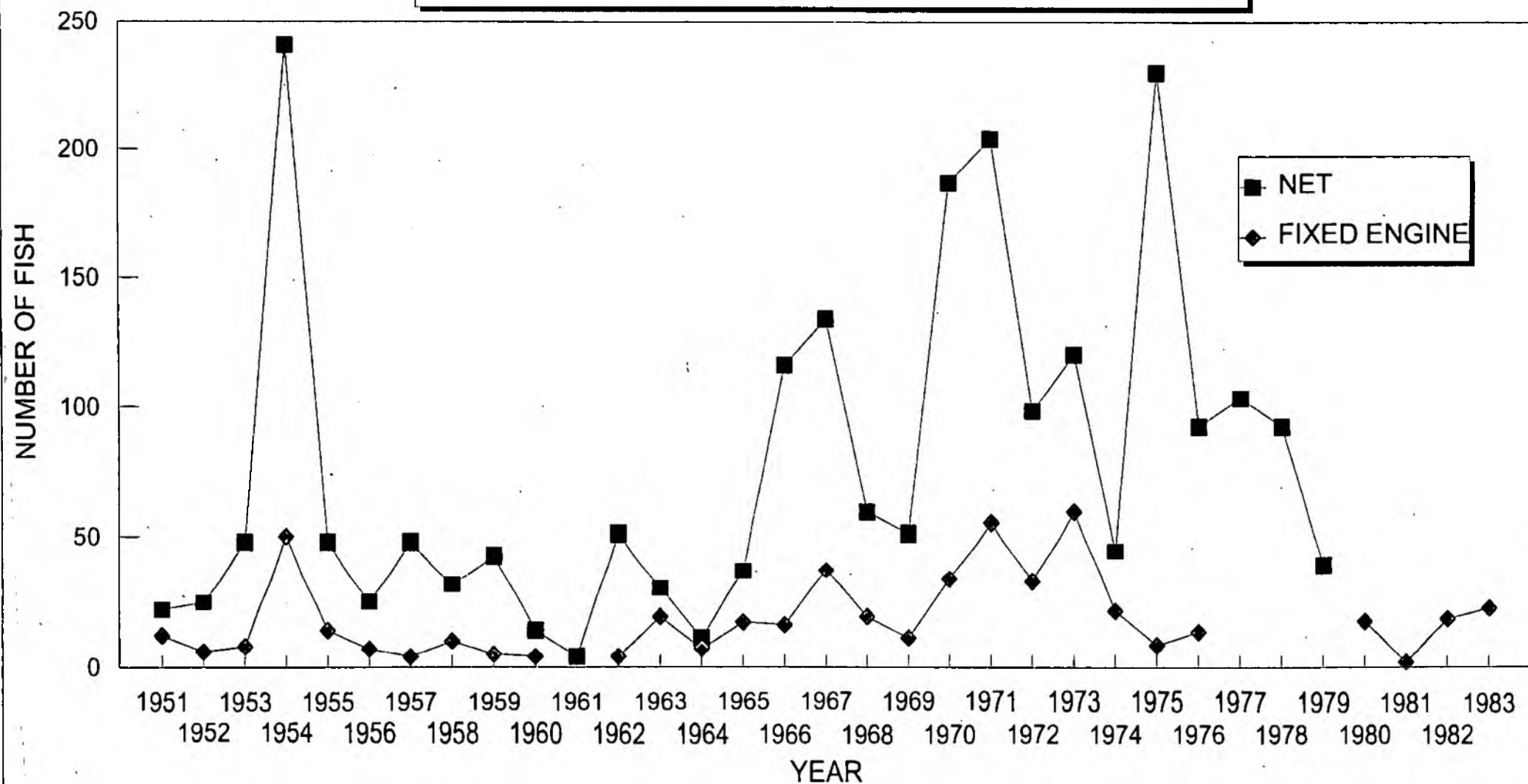
AVON ROD CATCH

SEA TROUT



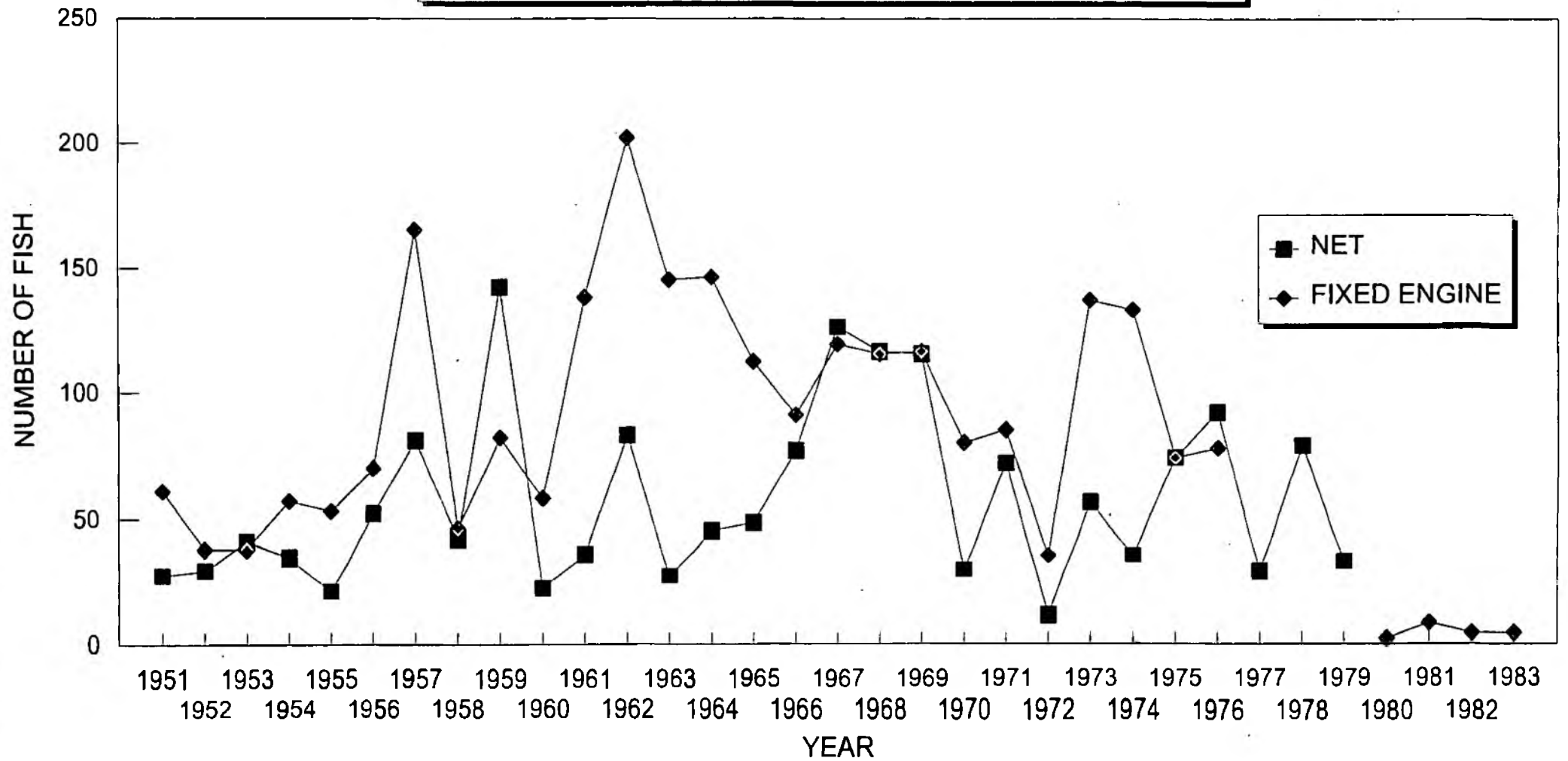
AVON NET & FIXED ENGINE CATCH

SALMON



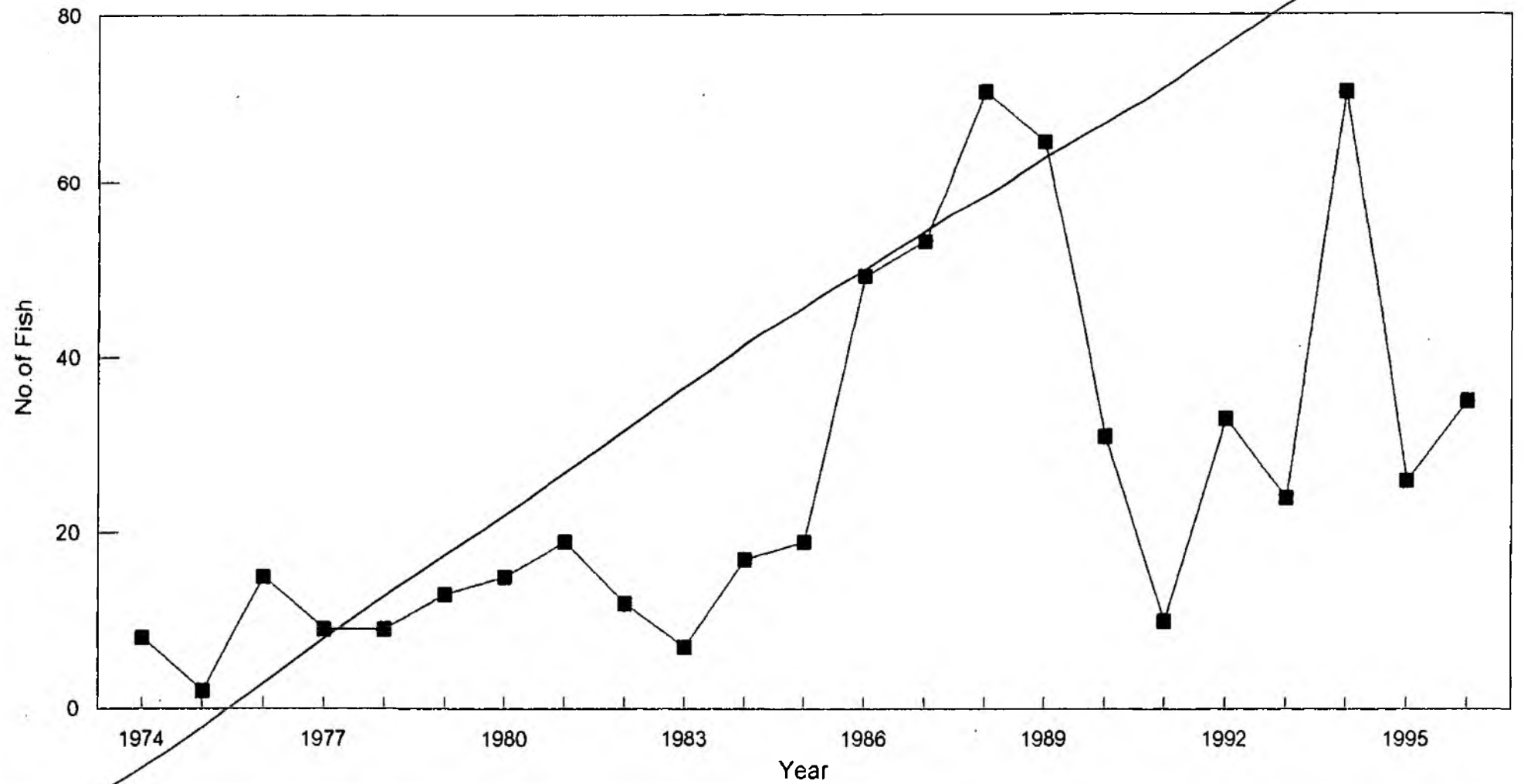
AVON NET & FIXED ENGINE CATCH

SEATROUT



AVON ROD CATCH

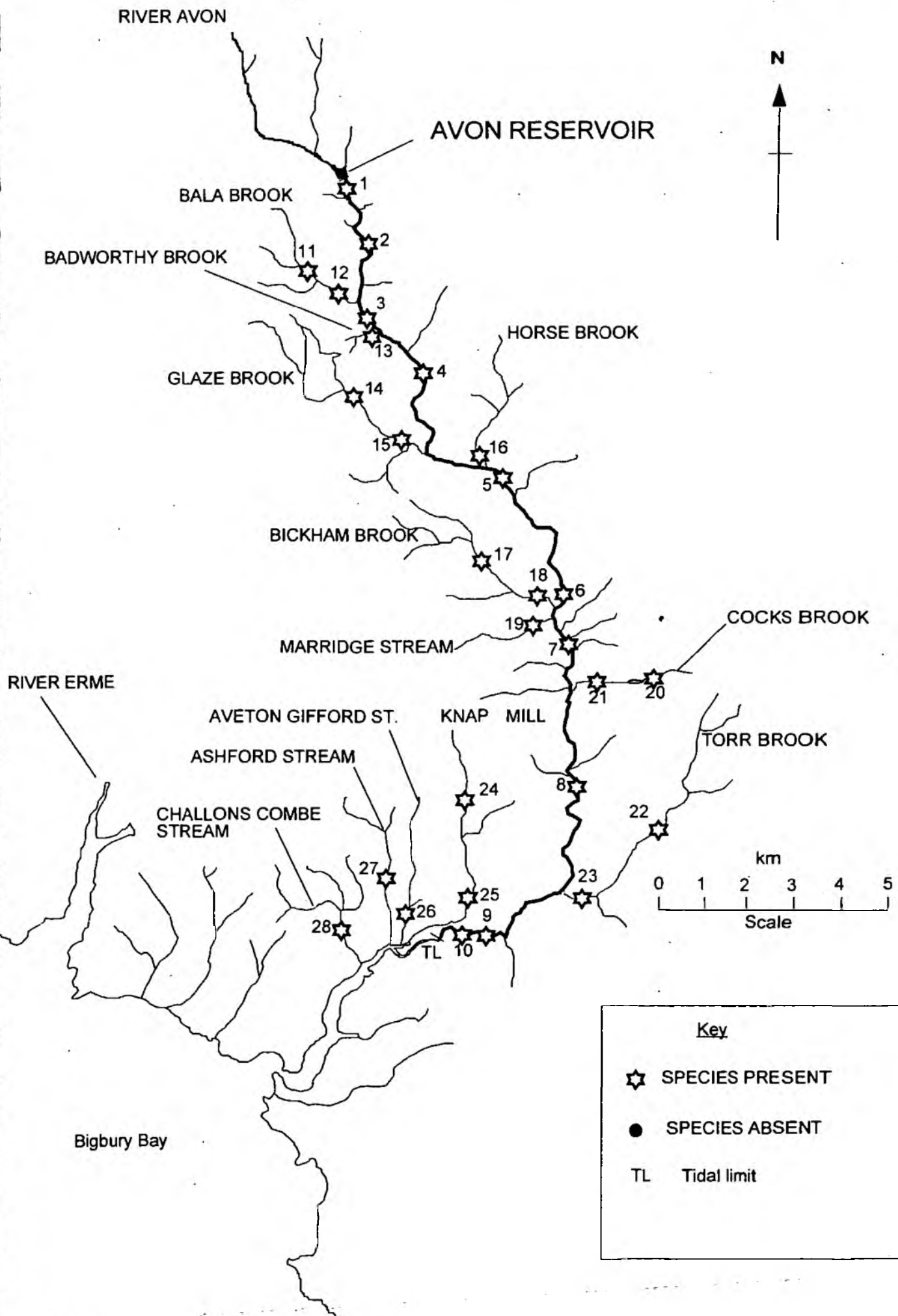
SALMON



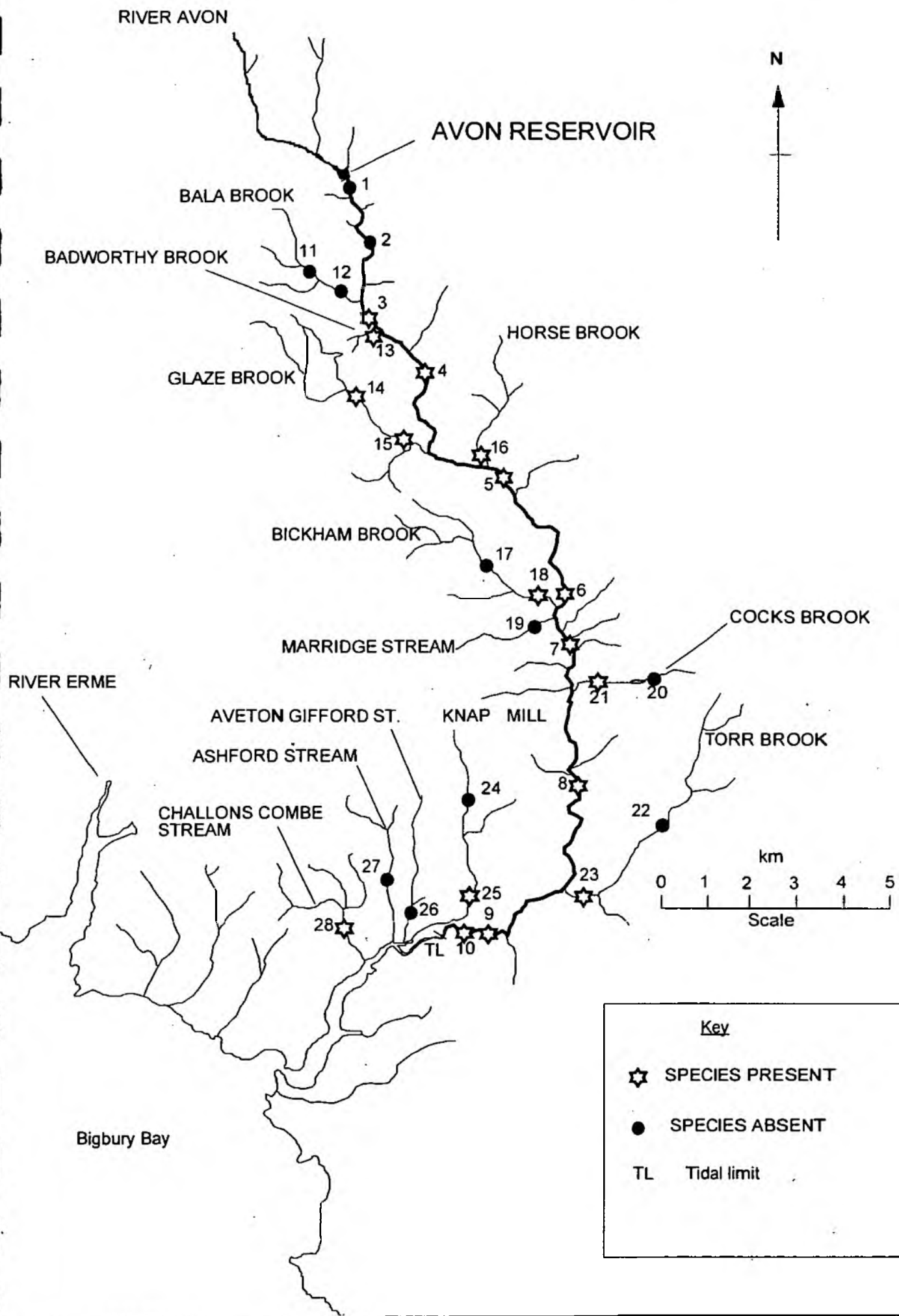
APPENDIX 3

FISH DISTRIBUTION MAPS OF SPECIES PRESENT WITHIN THE AVON
CATCHMENT

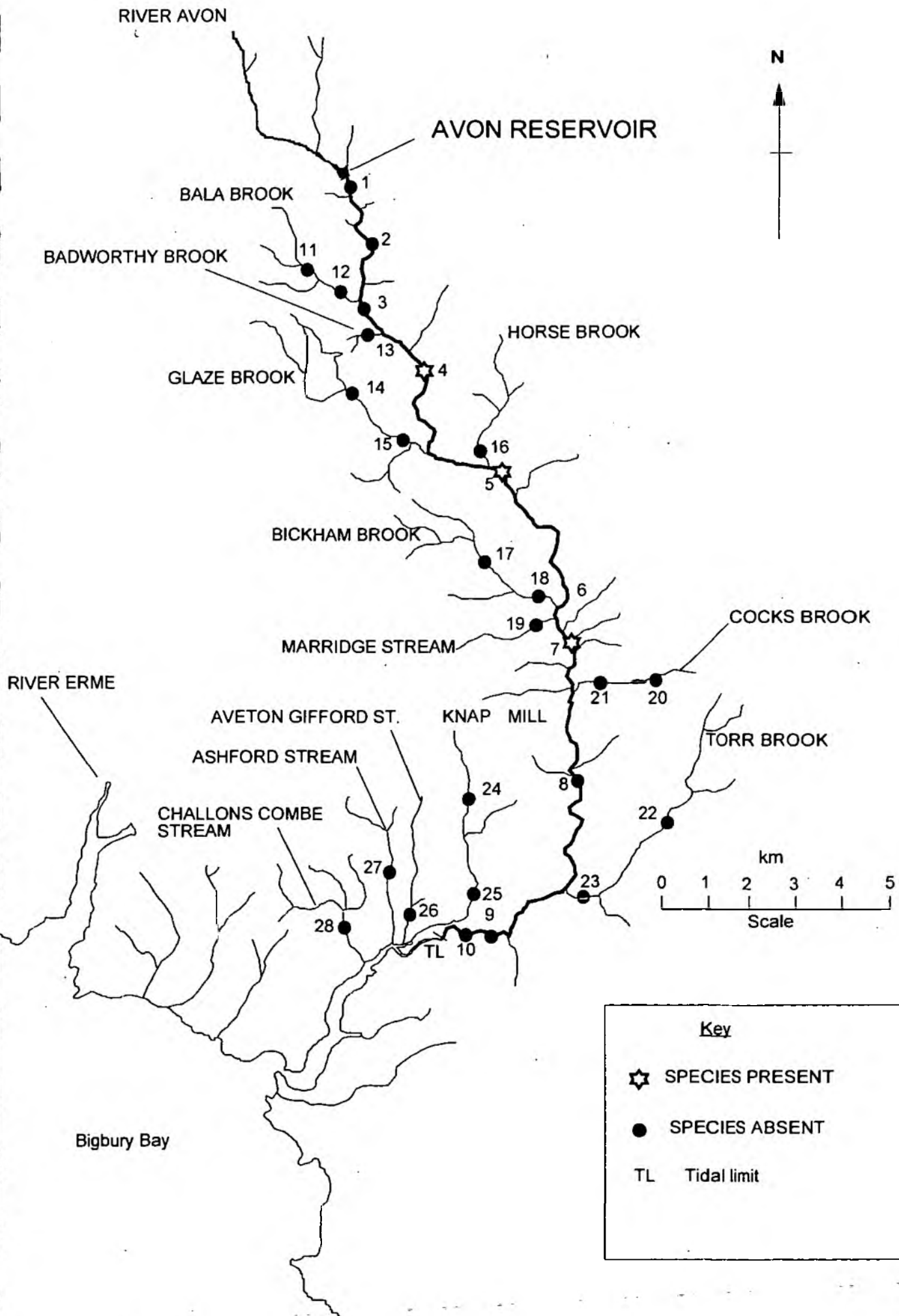
THE AVON CATCHMENT - DISTRIBUTION OF BROWN TROUT 1997



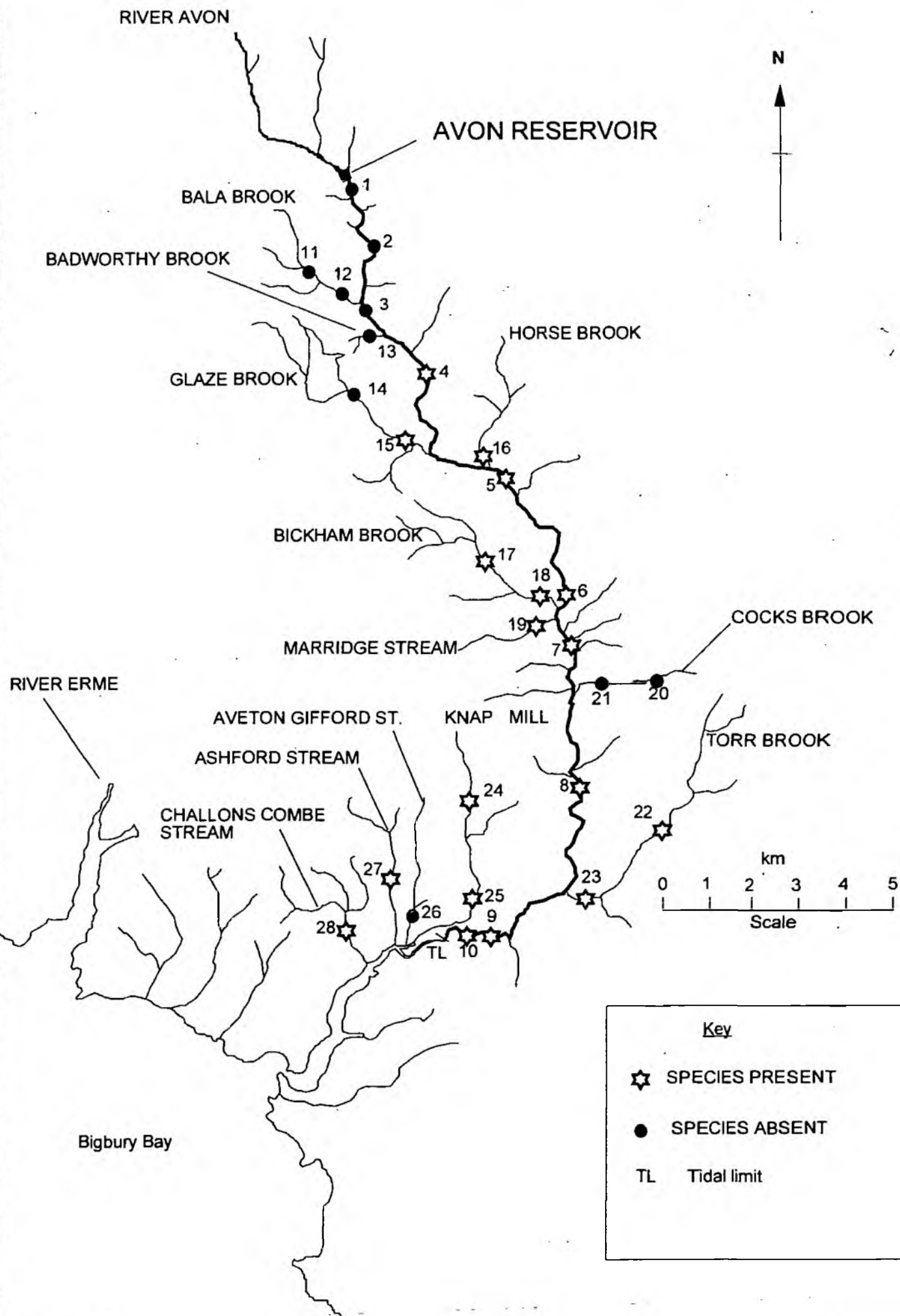
THE AVON CATCHMENT - DISTRIBUTION OF SALMON 1997



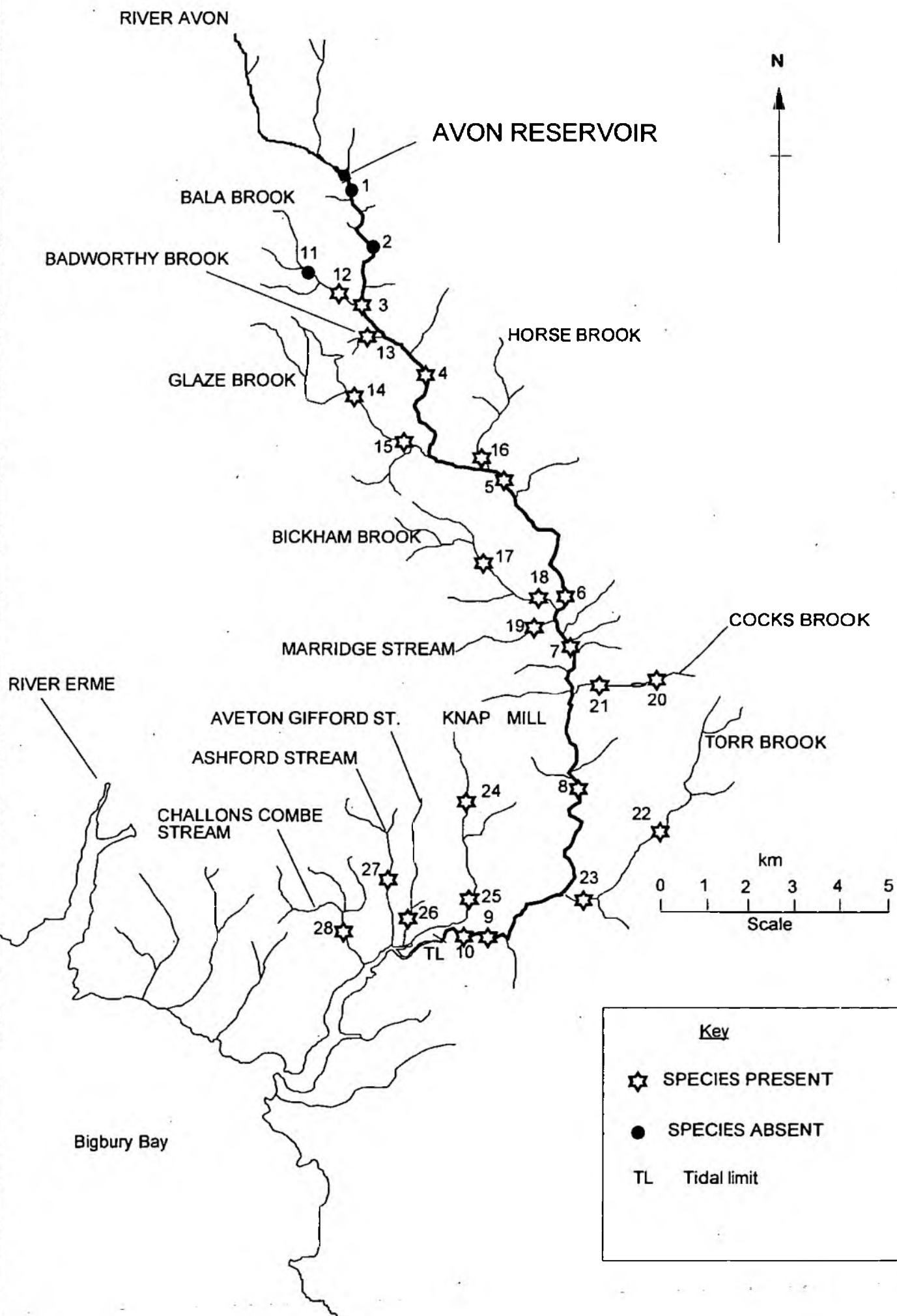
THE AVON CATCHMENT - DISTRIBUTION OF SEA TROUT 1997



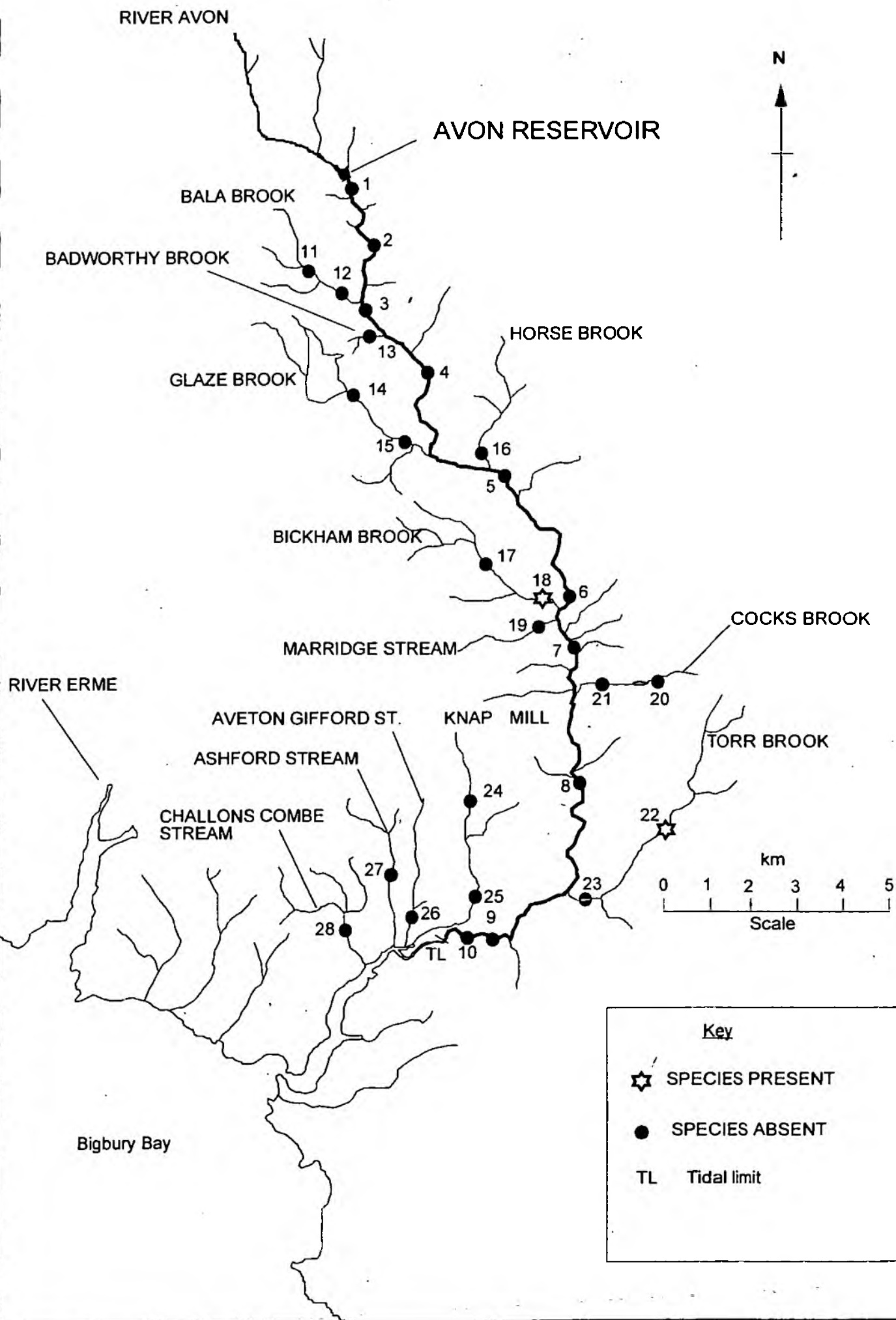
THE AVON CATCHMENT - DISTRIBUTION OF BULLHEADS 1997



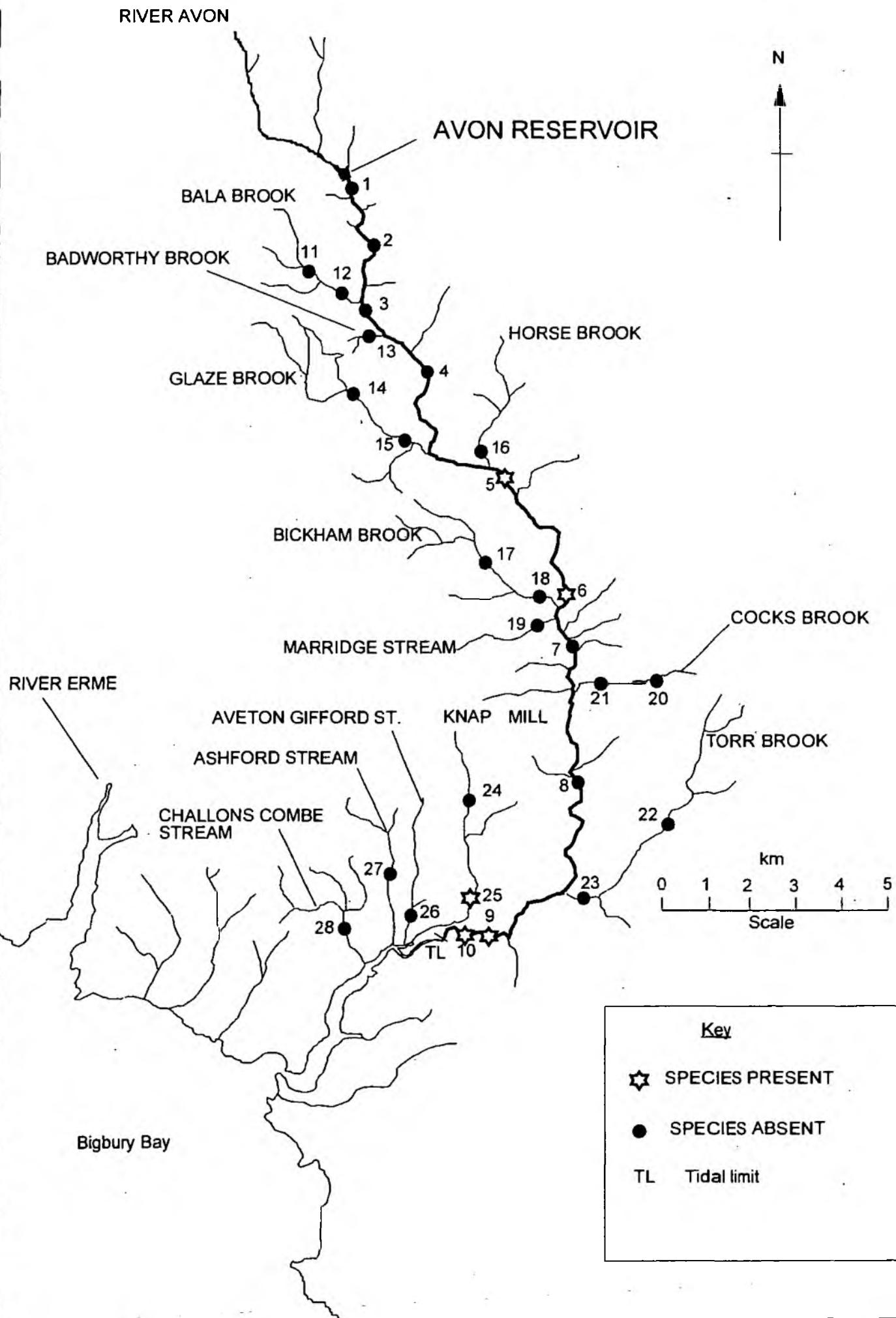
THE AVON CATCHMENT - DISTRIBUTION OF EELS 1997



THE AVON CATCHMENT - DISTRIBUTION OF LAMPREYS 1997



THE AVON CATCHMENT - DISTRIBUTION OF MINNOWS 1997



THE AVON CATCHMENT - DISTRIBUTION OF STONE LOACH 1997

