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National Rivers Authority
South West Region

ENVIRONMENTAL PROTECTION

SURFACE WATER QUALITY 1990

January 1992
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Manager

SURFACE WATER QUALITY 1990

LIST OF CONTENTS

RIVER WATER QUALITY 1990

- ## Regional Report

  - CHEMICAL

  -BIOLOGICAL

- ## National Report

  - CHEMICAL

  -BIOLOGICAL

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SHEET 1
1990 Survey Presentation

AKPE

NATIONAL CHEMICAL SURVEY 1990

- *3037km of river lengths monitored*
- *Lengths similar to 1985 Survey*
- *620 monitoring points*

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SHEET 2
1990 Survey Presentation

NATIONAL BIOLOGICAL SURVEY 1990

- *Regional Survey completed*
- *Sample identification completed*
- *Development and use of IFE RIVPACS system*
- *National Report being completed*
- *National Report to be published - Summer 1992*
- *Regional Report to follow publication of National Report*

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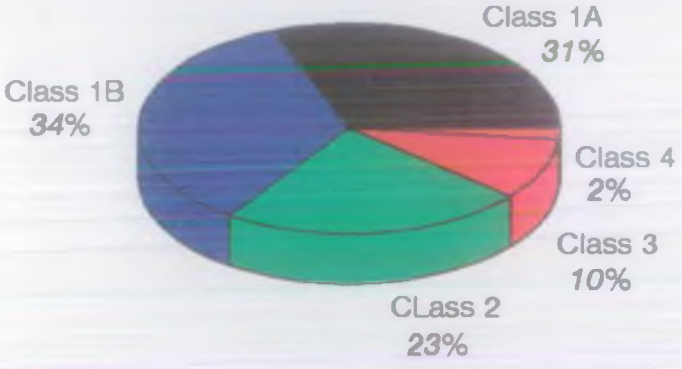
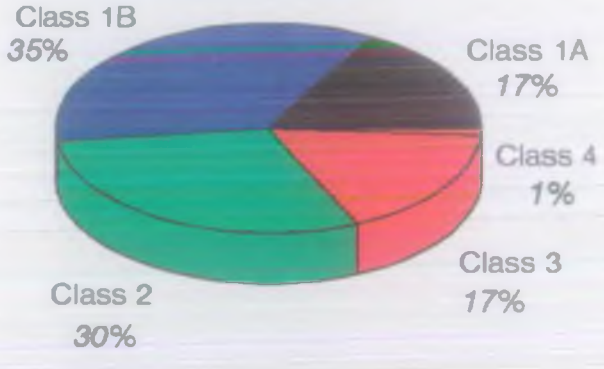
SHEET 3
1990 Survey Presentation

RIVER QUALITY IN ENGLAND AND WALES

Region	Percentage of River length in each class							Total (km)
	Good		Fair	Good & Fair	Poor	Bad	Poor & Bad	
	1a	1b	2	1a, 1b and 2	3	4	3 and 4	
Anglian	8	49	35	92	8	0.3	8	4328
Northumbria	60	26	11	97	3	0.2	3	2801
North West	45	14	20	79	16	5	21	5323
Severn-Trent	15	40	32	87	11	2	13	5721
Southern	23	47	22	92	7	1	8	2185
South West	17	35	30	82	17	1	18	3037
Thames	16	45	32	93	7	0.3	7	3530
Welsh	54	32	8	94	5	1	6	4647
Wessex	28	32	34	94	5	1	6	2622
Yorkshire	39	33	14	86	11	3	14	5767



Rivers in England and Wales
(39960 km)



Rivers in South West
(3037 km)

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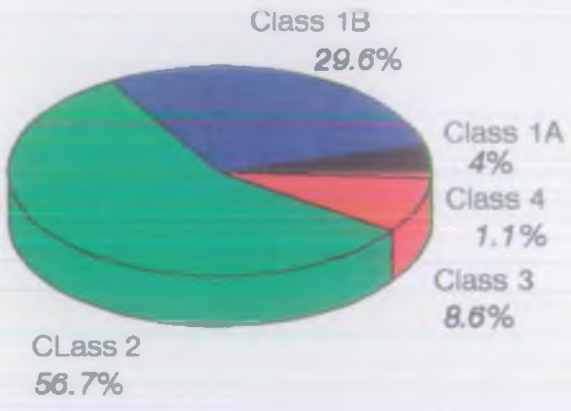
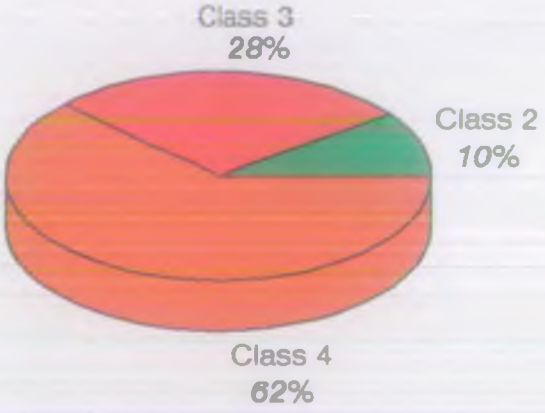
SHEET 4
1990 Survey Presentation

CANAL QUALITY IN ENGLAND AND WALES

Region	Percentage of Canal length in each class							Total (km)
	Good		Fair	Good & Fair	Poor	Bad	Poor & Bad	
	1a	1b	2	1a, 1b and 2	3	4	3 and 4	
Anglia	0	40	60	100	0	0	0	125
Northumbria	--	--	--	no canals	--	--	--	---
North West	5	12	79	96	4	0	4	577
Severn-Trent	2	32	59	94	6	0	6	990
Southern	0	26	74	100	0	0	0	41
South West	0	0	10	10	28	62	90	29
Thames	18	43	35	96	4	0	4	210
Welsh	0	37	45	83	17	0	17	152
Wessex	12	62	26	100	0	0	0	82
Yorkshire	1	31	32	64	32	4	36	268



Canals in England and Wales
(2474 km)



Canals in South West
(29 km)

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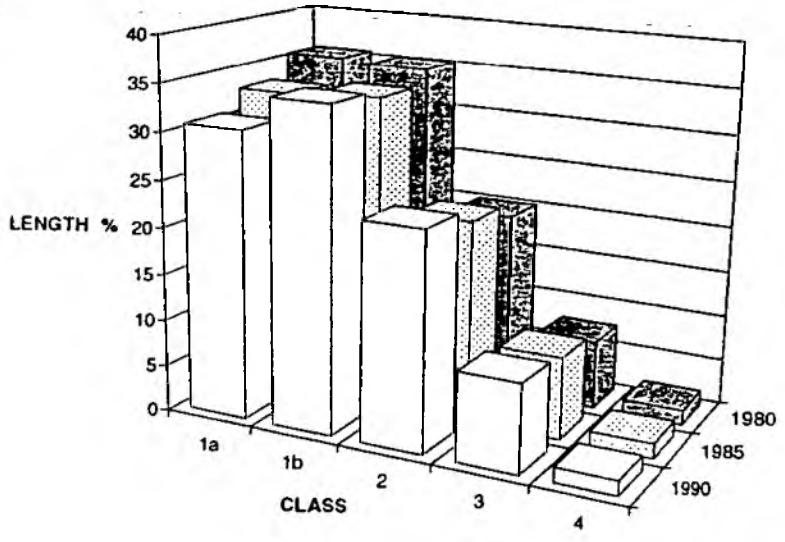
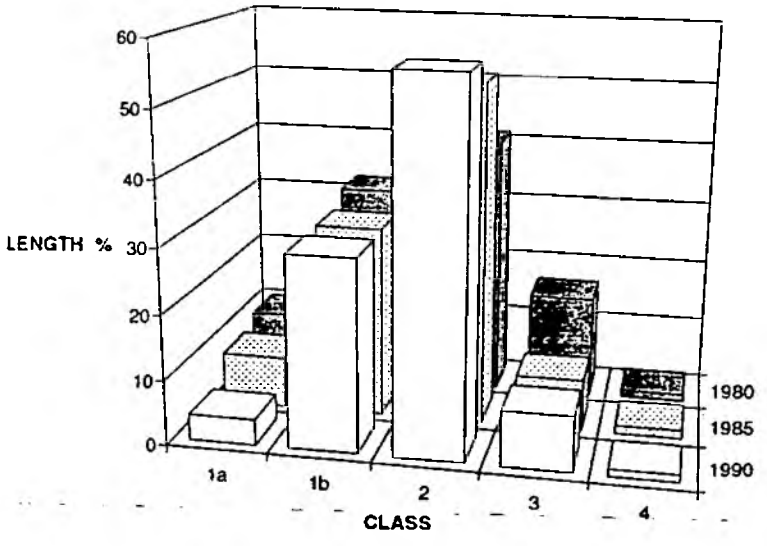
SHEET 5
1990 Survey Presentation

CHANGES SINCE PREVIOUS SURVEYS

River Quality in England and Wales (1980 - 1990)



Canal Quality in Engalnd and Wales (1980 - 1990)



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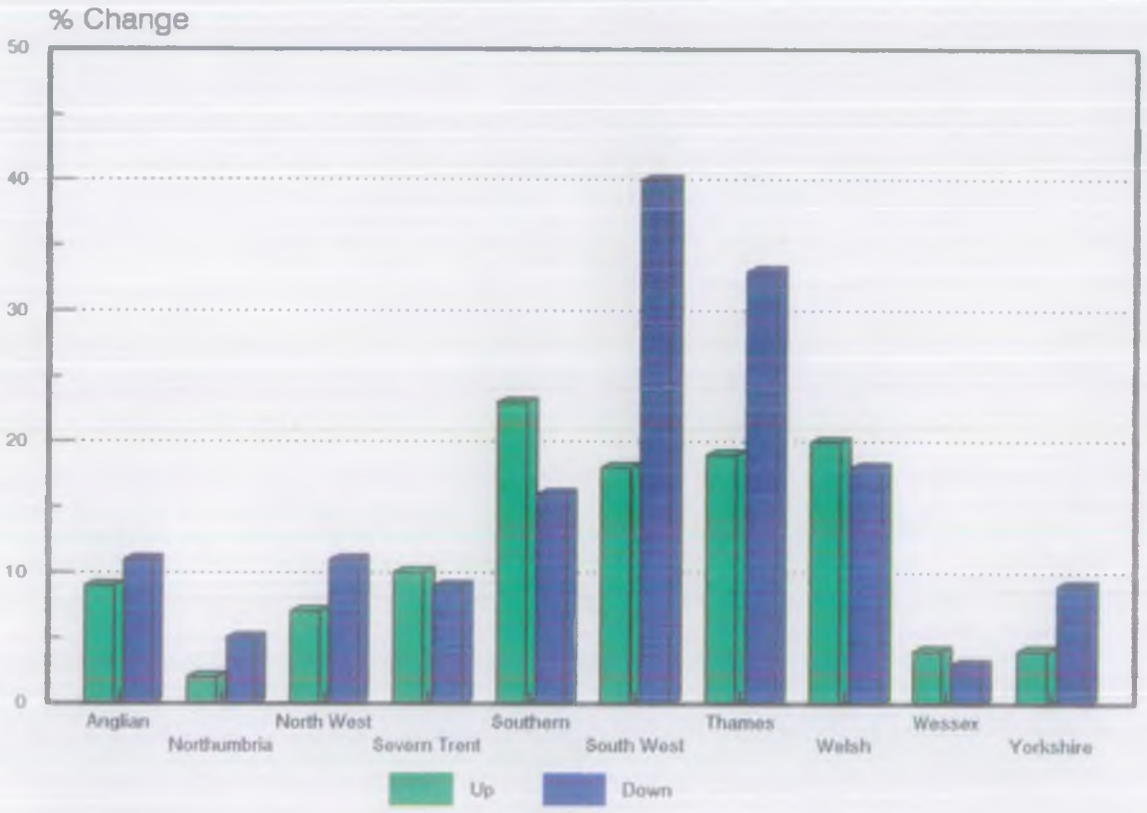
SHEET 6
1990 Survey Presentation

PERCENTAGE OF RIVER LENGTH CHANGING CLASS

1985 - 1990



Region	'85 - '90 Up	'85 - '90 Down	'85 - '90 Net
Anglian	9	11	-2
Northumbria	2	5	-3
North West	7	11	-4
Severn Trent	10	9	+1
Southern	23	16	+7
South West	18	40	-22
Thames	19	33	-14
Welsh	20	18	+2
Wessex	4	3	+1
Yorkshire	4	9	-5

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SHEET 7
1990 Survey Presentation

REGIONAL DIFFERENCES IN THE APPLICATION OF THE CLASS SYSTEM

- *Statistical methods used to calculate summaries of water quality (mainly 95 percentiles)*
- *The inclusion or exclusion of any analytical results that are markedly different from others from the same site*
- *Number of years data used for the assessment*
- *Inclusion or exclusion of non-routine samples*
- *Pooling of data for different sites*
- *Use of subjective judgements*
- *Use of EIFAC standards*
- *Statistical methods used to test for significant class changes*

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RIVER WATER QUALITY 1990

Regional Chemical Quality Report

- *4058 km of river length monitored*
- *An increased coverage of 31%*
- *932 Monitoring points*
- *45% Increase in monitoring points*
- *Sample frequency increased from 4 - 6 times per year to 12 times per year as a minimum*

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SHEET 9
1990 Survey Presentation

RIVER WATER QUALITY 1990

Regional Biological Quality Report

- Regional adoption of IFE RIVPACS system
- Biennial monitoring, 1990 and 1991
- 4231km of river length monitored
- 947 monitoring points
- 3 samples per site (Spring, Summer, Autumn)
- Regional report for 1990 and 1991

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RIVER WATER QUALITY 1990

River Quality Classification System

Quality Class	Description
Class 1A	Good Quality
Class 1B	Lesser Good Quality
Class 2	Fair Quality
Class 3	Poor Quality
Class 4	Bad Quality

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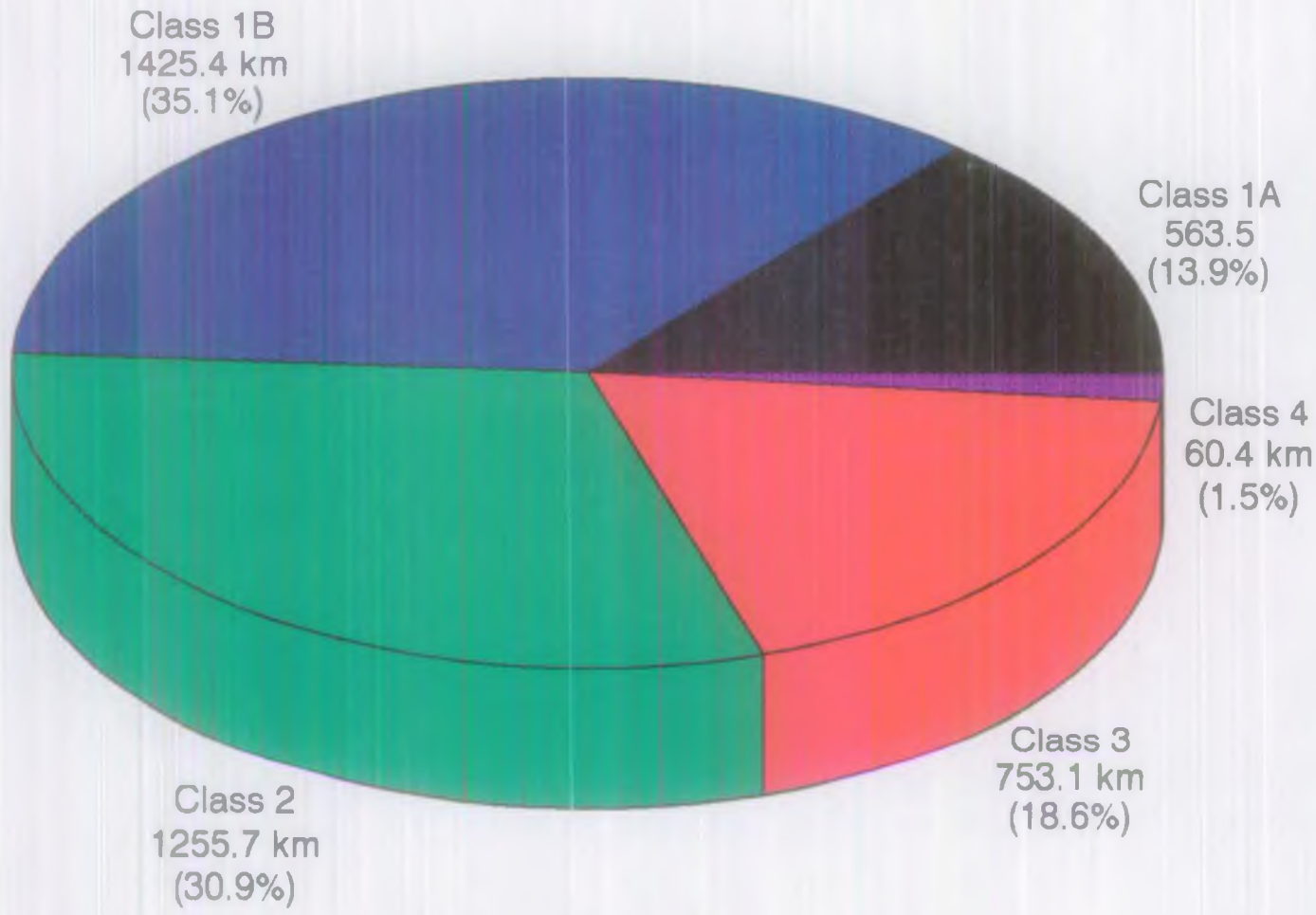
RIVER WATER QUALITY - 1990

Regional Classification



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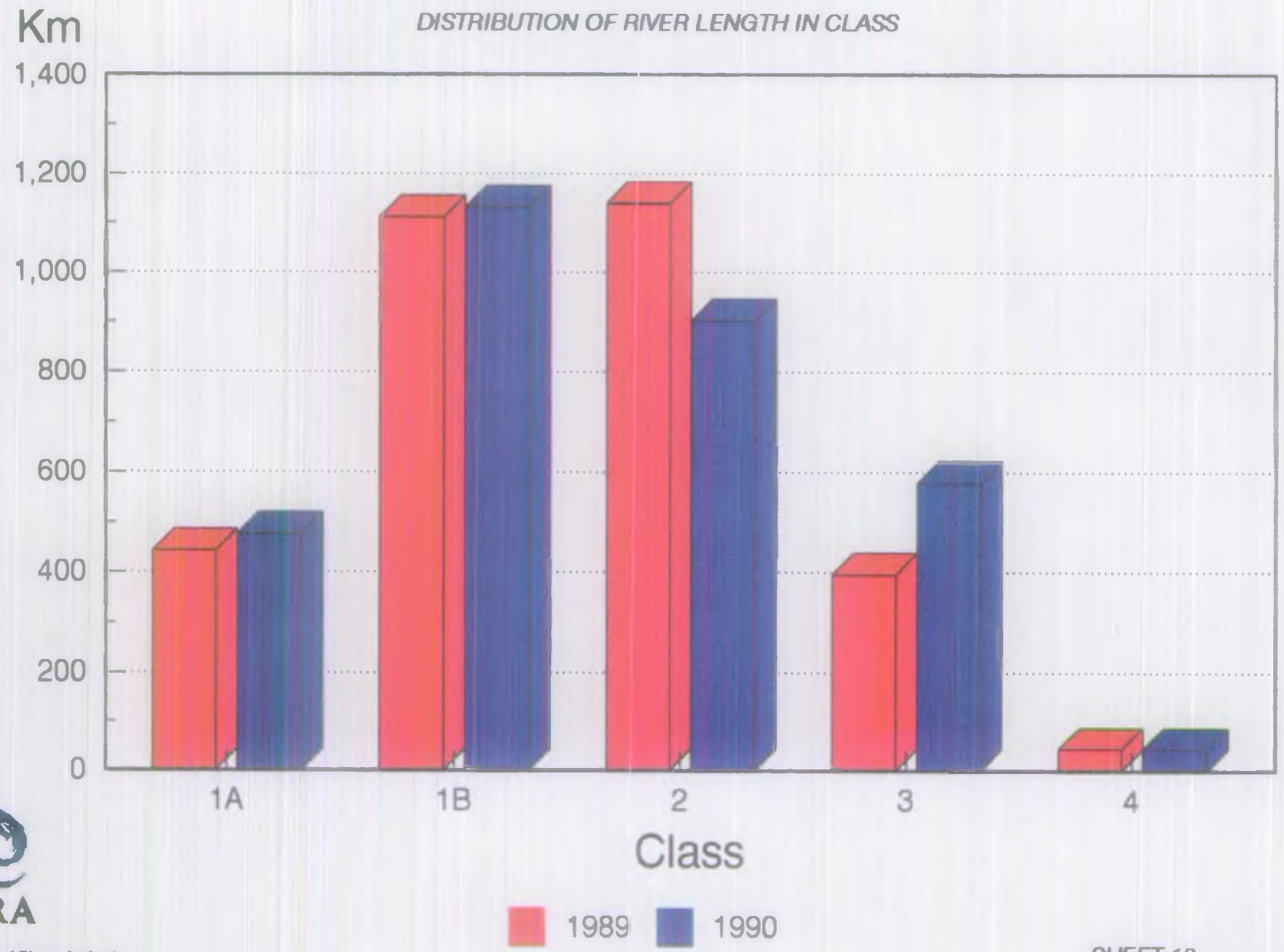
COMPARISON OF 1989 WITH 1990



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QUALITY CHANGES IN RIVER LENGTH (KM) FROM 1989 TO 1990 - SOUTH WEST REGION

CLASS	1989 Length	Length Unchanged	Length downgraded to				Length upgraded to			
			1b	2	3	4	1a	1b	2	3
1a	443	241	113	53	34	2	-	-	-	-
1b	1111	718	-	144	82	0	167	-	-	-
2	1139	612	-	-	187	7	64	269	-	-
3	395	265	-	-	-	13	4	31	82	-
4	43	22	-	-	-	-	-	1	11	9
TOTAL	3131	1858	113	197	303	22	235	301	93	9

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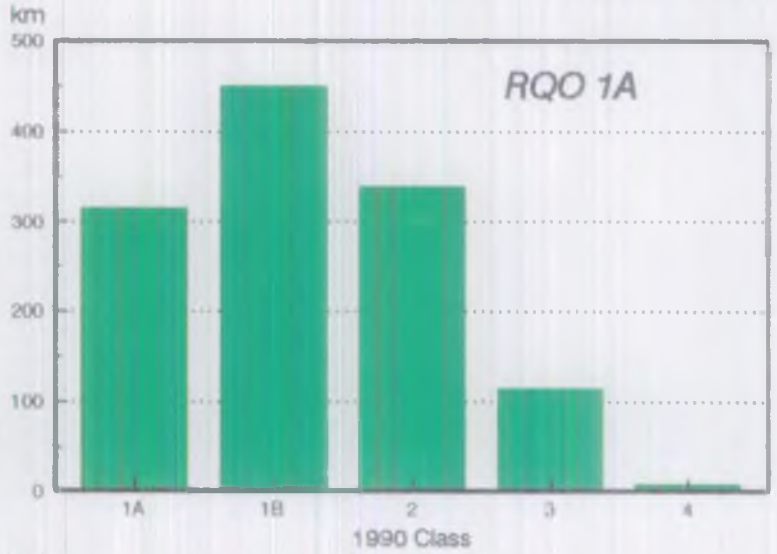
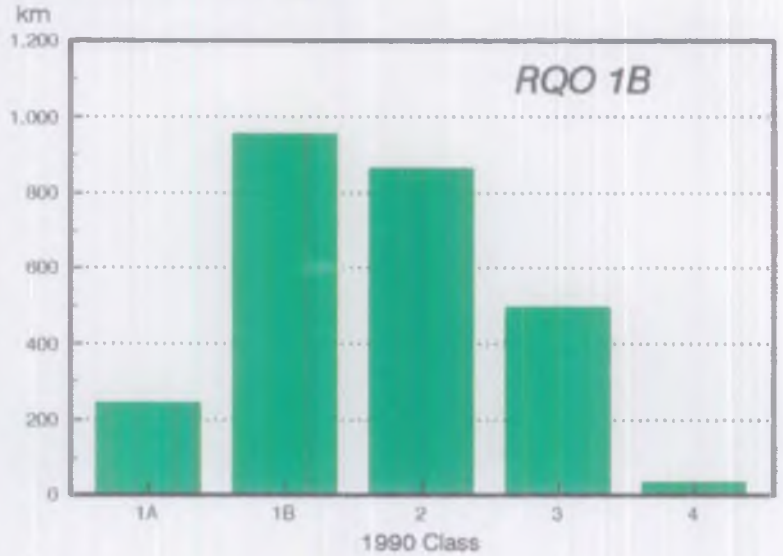
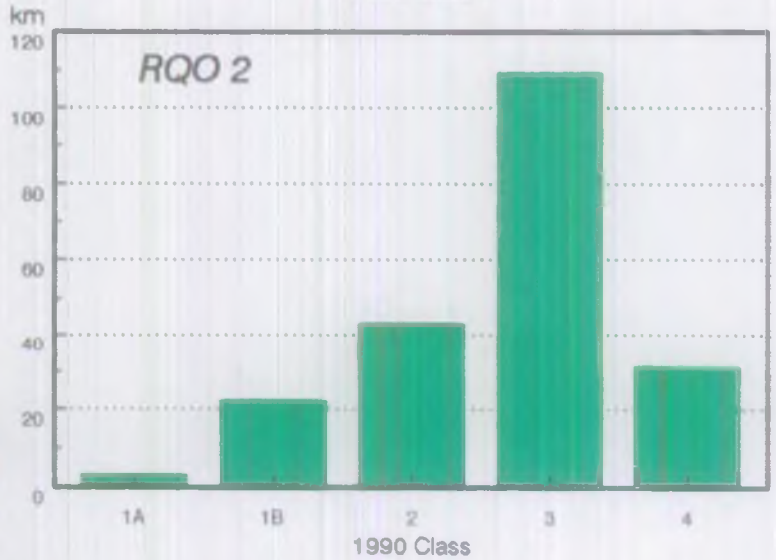
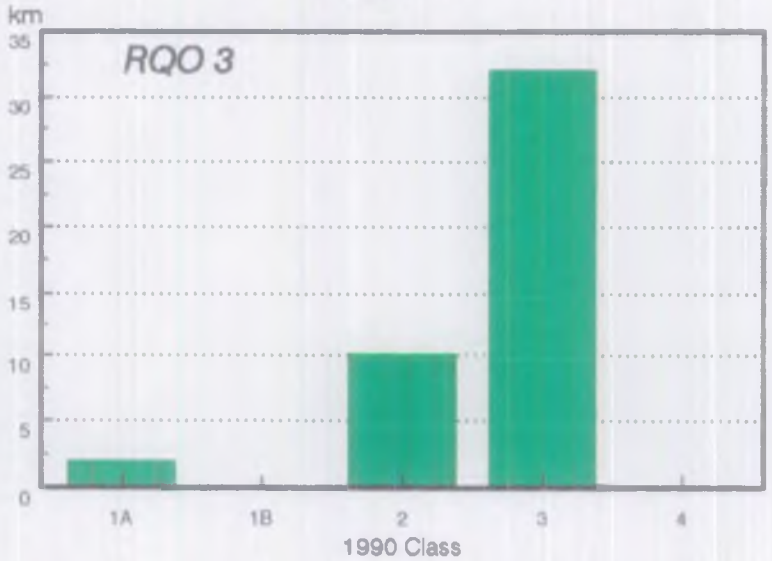
CLASS DISTRIBUTION BETWEEN RIVER QUALITY OBJECTIVES









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COMPLIANCE WITH RIVER QUALITY OBJECTIVES

- 1625km (40%) of river length complies
- 2433km (60%) of river length does not comply.
- 1422km (35%) fails to comply by only a single class.

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RIVER WATER QUALITY 1990
PROSPECTS FOR THE FUTURE

- *Catchment Planning. - Action and Management Plans*
  - Public Consultation
- *Special Task Forces. - Effective and rigorous pollution control*
- *More active campaign to prosecute illegal or non-compliant discharges.*
- *Considerable programme of capital investment by effluent dischargers.*
- *New farm waste regulations.*
- *Introduction of Statutory Water Quality Objectives.*
- *Review of effluent discharge consents*

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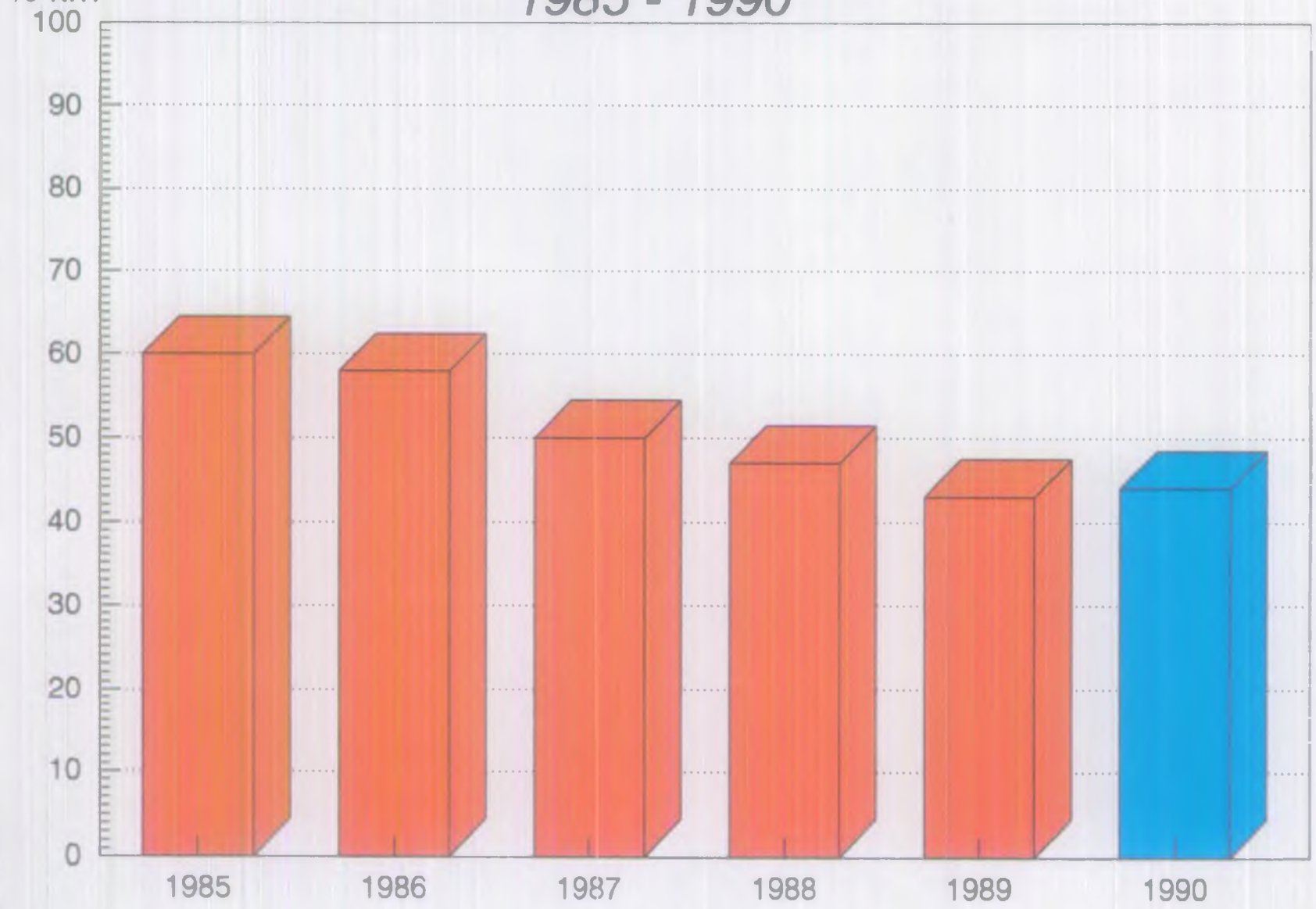
REPORTED COMPLIANCE WITH RIVER QUALITY OBJECTIVES

1985 - 1990



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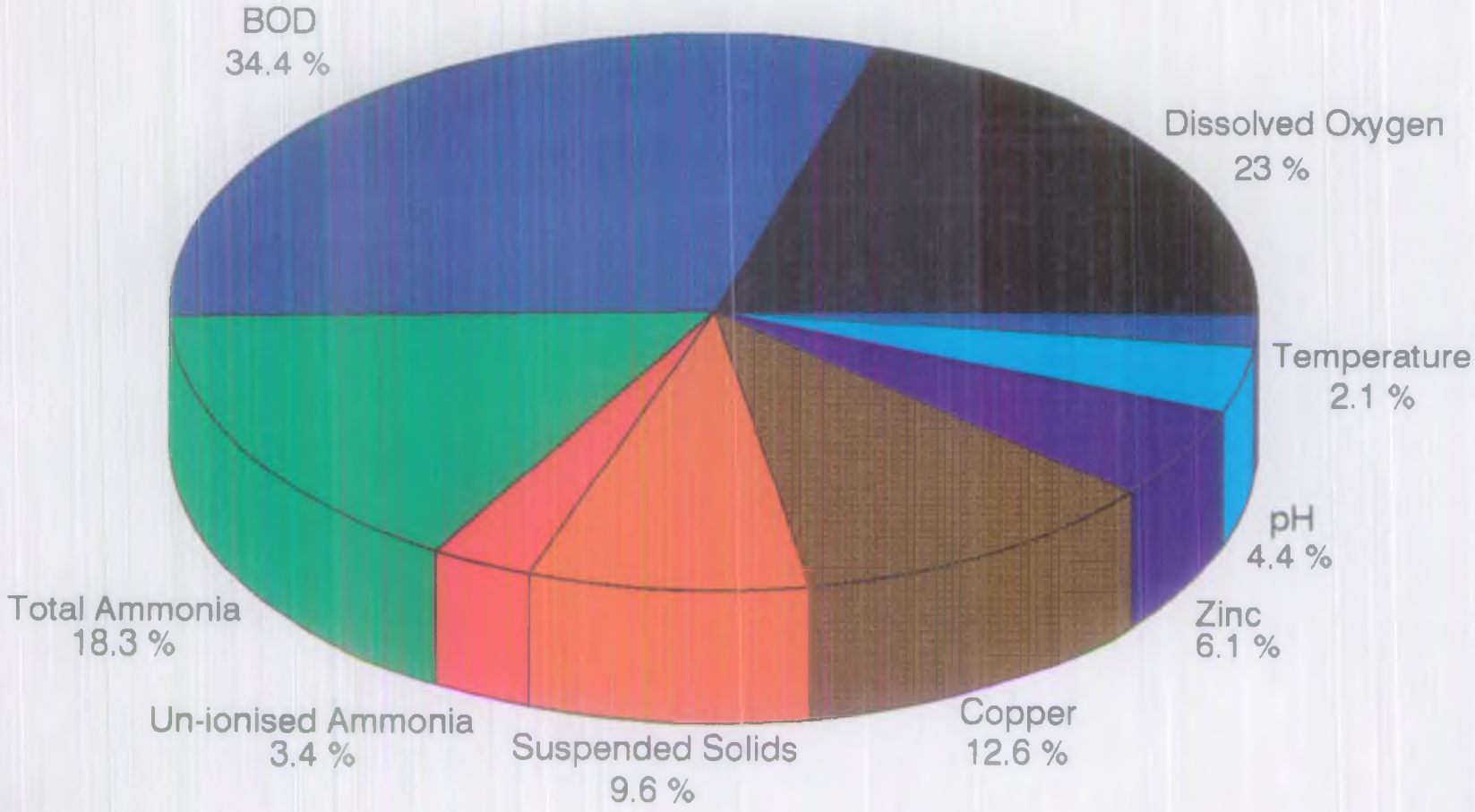
PRINCIPLE REASONS FOR NON-COMPLIANCE

SOUTH WEST REGION - 1990



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RIVER WATER QUALITY 1990

PRINCIPLE CAUSES OF NON-COMPLIANCE

- *Agricultural Activities*
- *Land Use Practices*
- *Historic Mining Activities*
- *Drought and Low Flows.*
- *Effluent Discharges*

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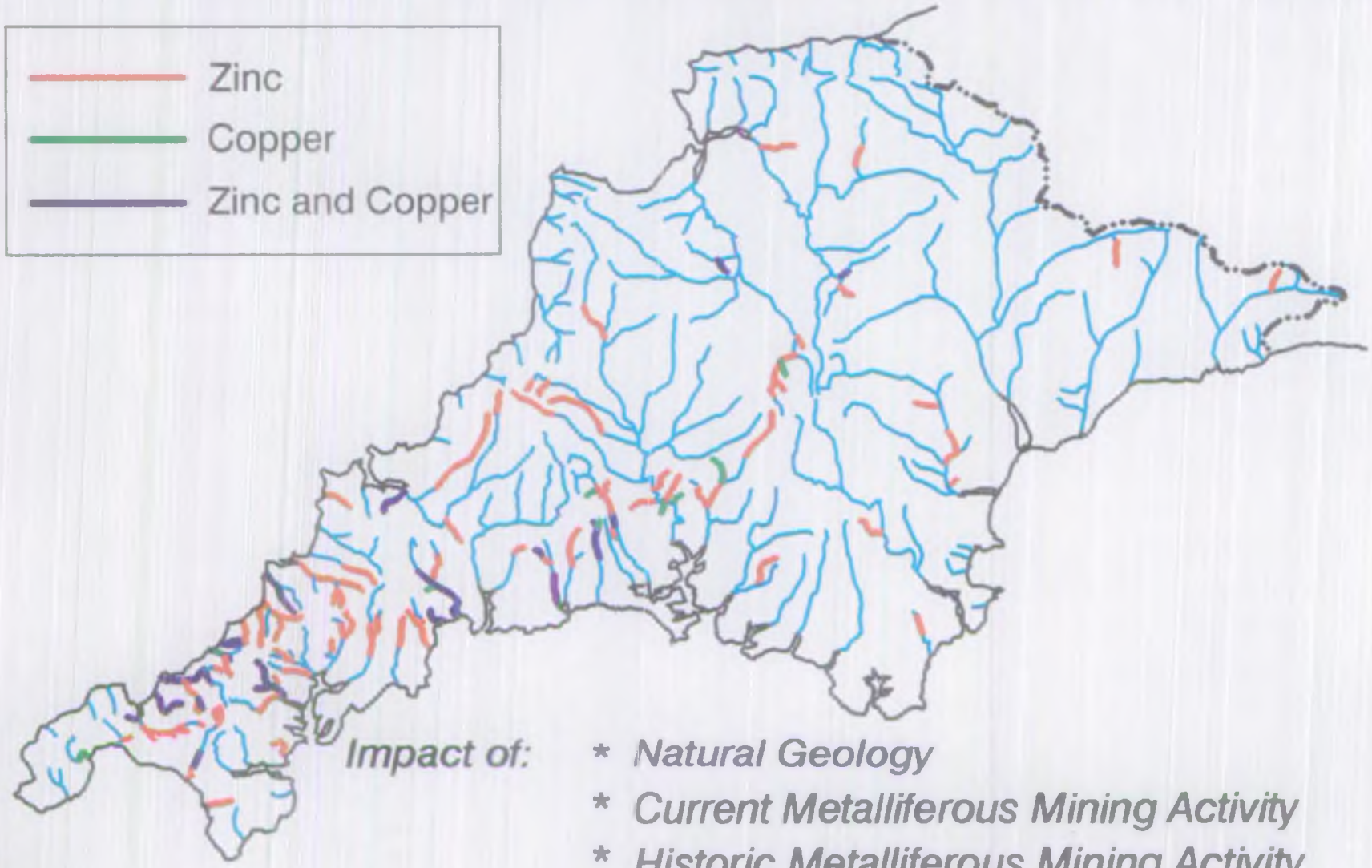
EIFAC Criteria Zinc and Copper Non-Compliance (1990)



Impact of:

- *Natural Geology*
- *Current Metalliferous Mining Activity*
- *Historic Metalliferous Mining Activity*
  - — *2000 Abandoned Mines*
  - — *Adit Drainage Water*
  - — *Associated Contaminated Land*

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RIVER WATER QUALITY 1990

RIVER TAMAR

Reach upstream of	River Quality Objective	85 NWC Class	86 NWC Class	87 NWC Class	88 NWC Class	89 NWC Class	90 NWC Class
BUSES BRIDGE	1B	2	2	2	2	1B	1B
INFLOW,UPPER TAMAR LAKE (INF. STRETCH)	1B	2	2	2	2	1B	1B
UPPER TAMAR LAKE	1B	2	2	2	1B	1B	2
INFLOW,LOWER TAMAR LAKE (UNMON. STRETCH)	1B	2	2	2	1B	1B	U
LOWER TAMAR LAKE	1B	2	2	2	1B	1B	1B
FOOTBRIDGE BELOW LOWER TAMAR LAKE	1B	2	2	2	1B	1B	1B
DEXBEER BRIDGE	1B	2	2	2	1B	1B	1B
MORETON MILL	1B	2	2	1B	2	1B	3
TAMARSTONE BRIDGE	1B	2	2	1B	2	1B	2
BRIDGERULE	1B	2	2	2	2	2	1B
CROWFORD BRIDGE	1B	2	2	2	2	2	2
TAMERTON BRIDGE	1B	2	2	2	2	2	2
BELOW CONFLUENCE WITH RIVER DEER	1B	2	2	2	2	2	3
BOYTON BRIDGE	1B	2	2	2	2	2	3
DRUXTON BRIDGE	1B	2	2	2	2	2	3
NETHERBRIDGE	1B	2	2	2	2	2	3
POLSON BRIDGE	1B	2	1B	1B	2	2	3
GREYSTONE BRIDGE	1B	2	1B	1B	2	2	3
HORSEBRIDGE	1B	2	1B	1B	2	1B	3
GUNNISLAKE BRIDGE	1B	2	2	2	1B	1B	3
NORMAL TIDAL LIMIT (INFERRED STRETCH)	1B	2	2	2	1B	1B	3

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NWC CLASSIFICATION SYSTEM

(Appendix 1)

River Class	Quality Criteria
1A	Dissolved oxygen % saturation greater than 80% BOD (ATU) not greater than 3 mg/l O Total ammonia not greater than 0.31 mg/l N Non-ionised ammonia not greater than 0.021 mg/l N Temperature not greater than 21.5 C pH greater than 5.0 and less than 9.0 Suspended solids not greater than 25 mg/l
1B	Dissolved oxygen % saturation greater than 60% BOD (ATU) not greater than 5 mg/l O Total ammonia not greater than 0.70 mg/l N Non-ionised ammonia not greater than 0.021 mg/l N Temperature not greater than 21.5 C pH greater than 5.0 and less than 9.0 Suspended solids not greater than 25 mg/l
2	Dissolved oxygen & saturation greater than 40% BOD (ATU) not greater than 9 mg/l O Total ammonia not greater than 1.56 mg/l N Non-ionised ammonia not greater than 0.021 mg/l N Temperature not greater than 28 C pH greater than 5.0 and less than 9.0 Suspended solids not greater than 25 mg/l
3	Dissolved oxygen % saturation greater than 10% BOD (ATU) not greater than 17 mg/l O
4	Dissolved oxygen % saturation not greater than 10% BOD (ATU) greater than 17 mg/l O

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River Tamar
River Quality Objectives

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River Tamar
1990 Quality Classification

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River Tamar
Non-Compliant River Lengths

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RIVER WATER QUALITY 1990

RIVER TAMAR

NUMBER OF SAMPLES (N) AND NUMBER OF SAMPLES EXCEEDING QUALITY STANDARDS (F)

Reach upstream of	pH Lower		pH Upper		Temperature		DO (%)		BOD (ATU)		Total Ammonia		Union. Ammonia		S.Solids		Total Copper		Total Zinc	
	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F
BUSES BRIDGE	43	-	43	-	43	-	43	-	43	1	43	1	43	-	43	1	34	-	34	-
UPPER TAMAR LAKE	12	-	12	-	12	-	12	1	12	1	12	-	12	-	12	1	12	-	12	-
LOWER TAMAR LAKE	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	3	12	-	12	-
FOOTBRIDGE BELOW LOWER TAMAR LAKE	37	-	37	-	37	-	37	1	37	1	37	-	37	-	37	5	36	-	36	-
DEXBEER BRIDGE	37	-	37	-	37	-	37	-	37	1	37	-	37	-	37	4	36	-	36	-
MORETON MILL	12	-	12	-	12	-	12	-	12	-	12	-	11	-	12	3	12	-	12	-
TAMARSTONE BRIDGE	44	-	44	-	44	-	43	2	44	2	44	-	44	-	44	7	38	-	38	1
BRIDGERULE	22	-	22	-	22	-	22	-	22	-	22	-	22	-	22	6	22	-	22	-
CROWFORD BRIDGE	37	-	37	1	36	-	36	-	37	4	37	3	36	-	37	8	34	1	34	1
TAMERTON BRIDGE	42	-	42	1	42	-	42	1	41	4	42	1	41	-	42	7	35	-	35	-
BELOW CONFLUENCE WITH RIVER DEER	12	-	12	-	12	-	12	-	12	1	12	-	12	-	12	3	12	-	12	-
BOYTON BRIDGE	42	-	42	1	42	-	42	4	42	3	42	-	41	-	42	9	38	-	38	1
DRAKTON BRIDGE	36	-	36	1	35	-	35	2	36	5	36	1	34	-	36	6	33	-	33	-
NETHERBRIDGE	37	-	37	1	35	-	35	1	37	4	37	1	33	-	37	8	36	-	36	-
POLSON BRIDGE	41	-	41	-	41	-	40	1	41	5	41	-	41	-	41	11	37	-	37	-
GREYSTONE BRIDGE	39	-	39	-	39	-	38	-	39	4	39	-	39	-	39	11	31	-	31	-
HORSEBRIDGE	39	-	39	-	39	-	39	-	39	1	39	-	39	-	39	10	32	-	32	-
GUNNISLAKE BRIDGE	61	-	61	-	60	1	60	1	61	3	61	-	29	-	61	12	59	-	59	-

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1990 Survey Presentation

RIVER WATER QUALITY 1990

RIVER TAMAR

PERCENTAGE EXCEEDENCE WITH DETERMINAND STATISTICS FROM QUALITY STANDARDS

Reach upstream of	PERCENTAGE EXCEEDENCE OF STATISTIC FROM QUALITY STANDARD									
	pH Lower	pH Upper	Temperature	DO (%)	BOD (ATU)	Total Ammonia	Un-ionised Ammonia	Suspended Solids	Total Copper	Total Zinc
BUSES BRIDGE	-	-	-	-	-	-	-	-	-	-
UPPER TAMAR LAKE	-	-	-	20	12	-	-	-	-	-
LOWER TAMAR LAKE	-	-	-	-	-	-	-	-	-	-
FOOTBRIDGE BELOW LOWER TAMAR LAKE	-	-	-	-	-	-	-	-	-	-
DEVEER BRIDGE	-	-	-	-	-	-	-	-	-	-
MORETON MILL	-	-	-	-	-	-	-	2	-	-
TAMARSTONE BRIDGE	-	-	-	19	16	-	-	-	-	-
BRIDGERULE	-	-	-	-	-	-	-	-	-	-
CROWFORD BRIDGE	-	-	-	-	77	20	-	-	-	-
TAMERTON BRIDGE	-	-	-	-	69	-	-	-	-	-
BELOW CONFLUENCE WITH RIVER DEER	-	-	-	-	2	-	-	68	-	-
BOYTON BRIDGE	-	-	-	23	28	-	-	7	-	-
DRAKTON BRIDGE	-	-	-	35	104	-	-	28	-	-
NETHERBRIDGE	-	-	-	-	53	-	-	23	-	-
POLSON BRIDGE	-	-	-	-	14	-	-	44	-	-
GREYSTONE BRIDGE	-	-	-	-	32	-	-	61	-	-
HORSEBRIDGE	-	-	-	-	-	-	-	25	-	-
GUNNISLAKE BRIDGE	-	-	-	-	44	-	-	32	-	-

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RIVER WATER QUALITY 1990

CATCHMENT COMPLIANCE AND STATISTICS

CATCHMENT	No. of Sites	1989 Total km	1989 Compliance % km	1990 Total km	1990 Compliance % km	
Lim	1	6.4	100.0	6.4	100.0	
Axe	35	161.0	26.0	170.9	29.1	↑
Sid	4	10.2	100.0	14.7	34.0	↓
Otter	29	72.7	50.8	116.8	50.0	–
Exe	103	479.2	41.0	634.8	43.0	↑
Teign	50	133.1	49.7	207.6	27.6	↓
Dart	35	170.5	22.3	208.0	12.4	↓
Avon & Gara	21	47.7	71.5	74.8	36.5	↓
Erme	6	20.5	71.7	20.5	16.6	↓
Yealm	17	48.6	16.9	48.6	22.8	↑
Plym	16	25.9	81.9	42.8	44.9	↓
Tavy	25	86.7	23.3	105.6	31.6	↑
Tamar	94	433.2	46.4	443.7	43.3	↓
Lynher	20	61.2	0.0	79.1	3.3	↑
Seaton	9	20.5	9.3	26.6	7.1	↓
Looe	16	42.2	22.5	43.5	23.4	–
Fowey	24	73.9	92.4	107.6	74.7	↓
Par	18	29.8	63.1	44.9	45.4	↓
St Austell	17	36.5	53.4	49.3	29.8	↓
Fal	52	133.5	28.2	175.4	33.0	↑
Helford	20	73.7	19.9	79.1	46.4	↑
Cober	8	22.8	0.0	28.3	19.1	↑
Lands End Streams	34	51.3	29.8	84.0	28.8	–
Hayle	14	29.4	38.1	38.6	26.9	↓
Red	30	78.8	39.1	97.3	40.9	–
Gannel	10	24.5	33.1	24.5	26.9	↓
Porth	16	26.5	24.9	56.6	53.1	↑
Camel	36	104.7	64.6	131.1	55.6	↓
Valency	5	8.0	100.0	22.1	36.2	↓
Strat	12	48.4	31.2	53.9	47.1	↑
Hartland Streams	1			9.5	100.0	–
Torridge	73	233.7	56.0	322.7	48.5	↓
Taw	68	364.6	43.5	413.3	49.2	↑
Lyn	13	24.1	63.9	78.5	60.4	↓
TOTAL	932	3,177.8	42.1	4,058.1	40.1	

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RIVER WATER QUALITY 1990

CLASS DISTRIBUTION WITHIN CATCHMENTS

CATCHMENT	Total Length (km)	Km in Class 1A	Km in Class 1B	Km in Class 2	Km in Class 3	Km in Class 4
Lim	6.4	0.0	6.4	0.0	0.0	0.0
Axe	170.9	6.8	57.5	80.0	26.6	0.0
Sid	14.7	0.0	10.2	4.5	0.0	0.0
Otter	116.8	14.3	64.2	23.7	8.6	6.0
Exe	634.8	103.1	198.5	192.8	112.8	27.6
Teign	207.6	44.7	79.7	57.8	25.4	0.0
Dart	206.0	15.9	70.5	47.1	72.5	0.0
Avon & Gara	74.8	14.2	21.0	30.8	8.7	0.1
Erme	20.5	3.4	3.4	13.7	0.0	0.0
Yealm	48.6	11.1	10.9	2.0	24.6	0.0
Plym	42.8	15.8	8.0	5.8	13.2	0.0
Tavy	105.6	20.0	29.1	32.5	24.0	0.0
Tamar	443.7	37.0	185.9	123.9	96.9	0.0
Lynher	79.1	0.0	20.9	48.4	9.8	0.0
Seaton	26.6	0.0	5.7	19.0	1.9	0.0
Looe	43.5	0.0	10.2	25.4	7.9	0.0
Fowey	107.6	65.2	15.2	27.2	0.0	0.0
Par	44.9	0.0	15.7	4.0	25.2	0.0
St Austell	49.3	0.0	17.9	3.0	21.6	6.8
Fal	175.4	17.5	33.7	65.1	59.1	0.0
Helford	79.1	7.8	28.9	26.3	19.1	0.0
Cober	28.3	0.0	5.4	10.3	9.6	3.0
Lands End Streams	84.0	14.5	25.7	24.0	19.8	0.0
Hayle	38.6	0.0	8.8	26.5	3.3	0.0
Red	97.3	7.2	22.1	35.5	30.3	2.2
Gannel	24.5	0.0	6.3	9.9	4.3	4.0
Porth	55.6	7.3	26.5	16.3	5.5	0.0
Camel	131.1	24.9	58.0	29.0	19.2	0.0
Valency	22.1	4.9	3.1	5.3	8.8	0.0
Strat	53.9	0.0	25.4	19.7	8.8	0.0
Hartland Streams	9.5	0.0	9.5	0.0	0.0	0.0
Torridge	322.7	21.4	156.3	99.8	45.2	0.0
Taw	413.3	67.3	176.6	118.5	43.4	7.5
Lyn	78.5	39.2	8.2	27.9	0.0	3.2
TOTAL	4,058.1	563.5	1,425.4	1,256.7	753.1	60.4

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1990 & 1991 BIOLOGICAL SURVEYS

RIVERS

	River Length (km)	No. of sites
1990	2513	493
1991	1800	469
Total in Survey nb. 23 sites were sampled in both years	4231	947
Sites in Biological Survey, but not in Chemical Survey.	277	80

CANALS

	River Length (km)	No. of sites
1990	26	3
1991	1	2
Total in Survey	27	5

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SUMMARY OF 1990 NATIONAL RIVER SURVEY RESULTS

Biological Class	Length of river (km)	%
A	2220	52
B	192	5
C	85	2
D	17	<1
Unsuitable for Classification	19	<1
Not Sampled in 1990 Included in 1991 National Survey	1699	40

88% of river length classified in 1990 was in biological class A, equivalent to 83% of sites.

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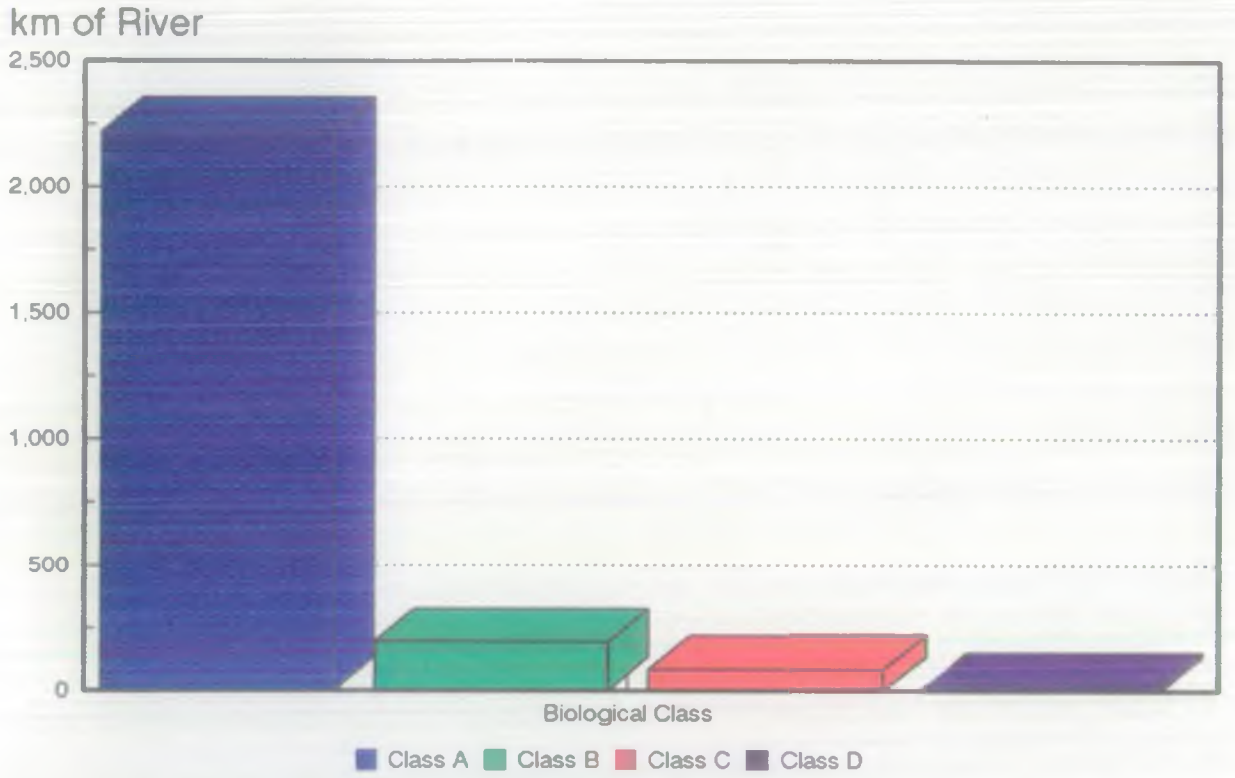
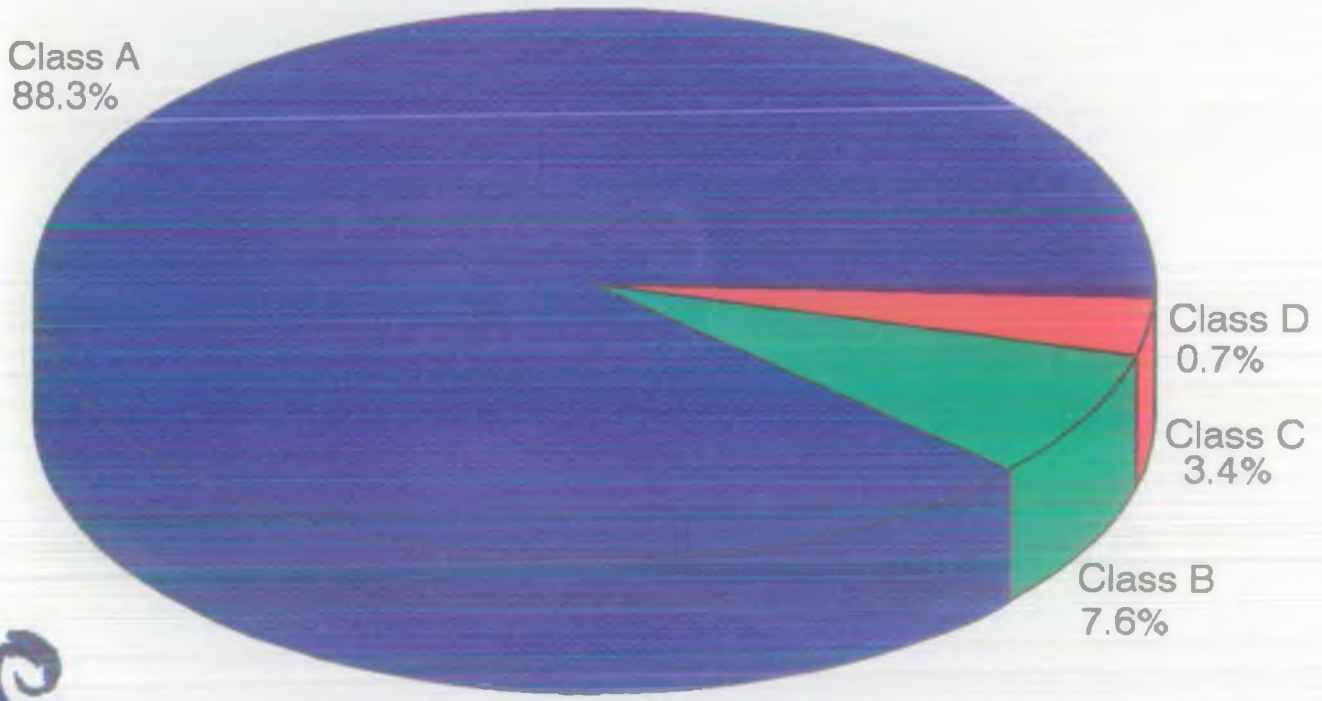
1990 SURVEY BY km OF RIVER





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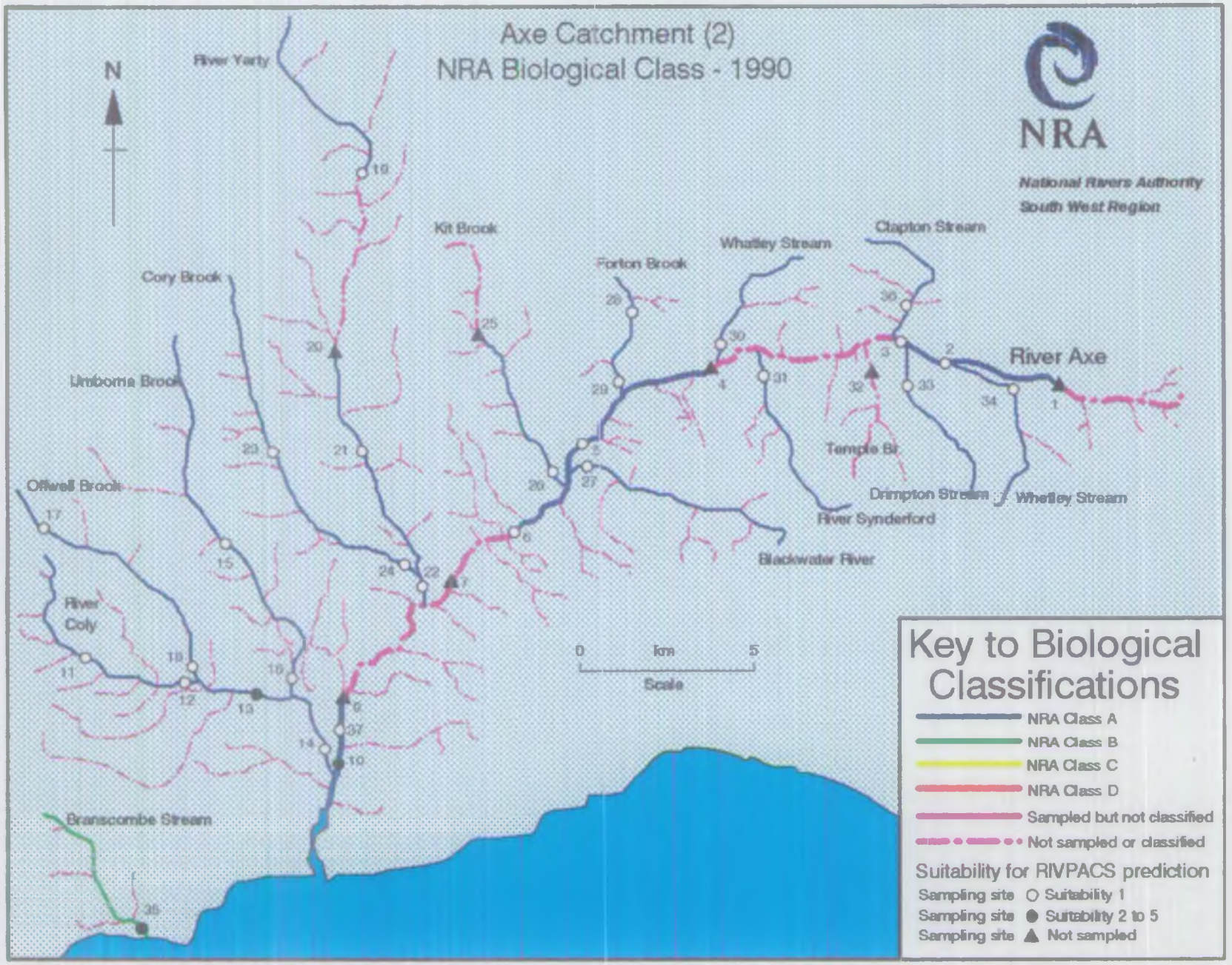

SHEET 34

1990 Survey Presentation

Monitored Estuaries in the NRA South West Region

- *22 estuaries*
- *3 tidal cycle surveys per annum*
- *116 Monitoring points*
- *796 km of shoreline*
- *14473 ha in area*
- *843 discharges to estuaries*

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South West Region

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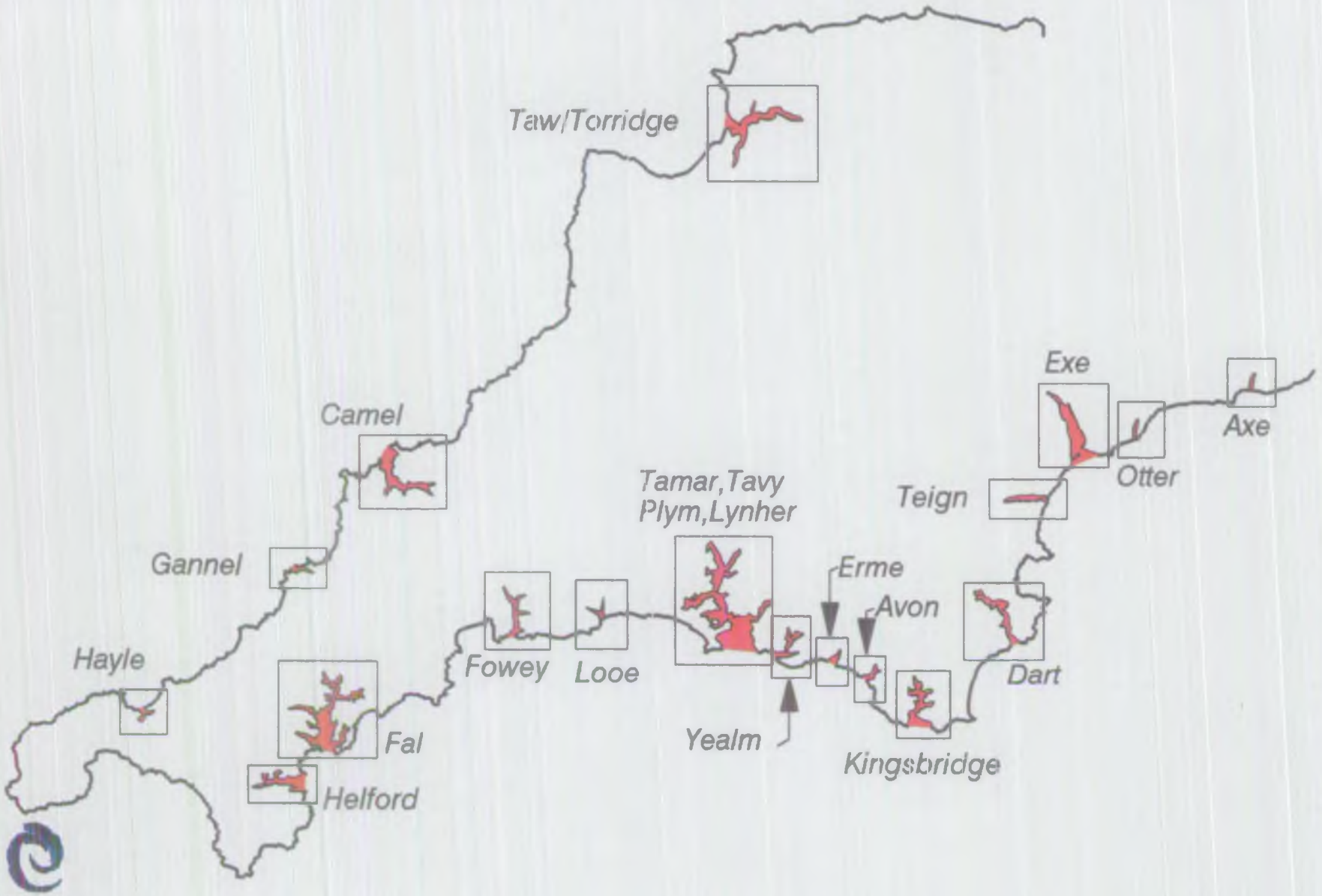
1990 Survey Presentation

Monitored Estuaries in South West Region



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1990 Survey Presentation

ESTUARY WATER QUALITY

Class A	*Good Quality*
Class B	*Fair Quality*
Class C	*Poor Quality*
Class D	*Bad Quality*

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1990 Survey Presentation

ESTUARY WATER QUALITY, 1990

Quality Class	Kilometres
Class A	280.8
Class B	16.7
Class C	0.0
Class D	0.0

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1990 Survey Presentation