

EUROPEAN COMMUNITY SURFACE-WATER
ABSTRACTION DIRECTIVE

BACTERIOLOGICAL RESULTS

1989

NRA THAMES REGION
ENVIRONMENTAL CONTROL
FOBNEY MEAD
ROSE KILN LANE
READING RG2 OSF

TEL : 0734 - 311422
FAX : 0734 - 311438

BIOLOGY WEST
John Steel
Paul Logan
Richard Ashby-Crane
Julie Bywater
Les Ruse
William Yeomans

ENVIRONMENT AGENCY



042399

Coliform / Salmonella Levels in the Middle Thames, 01/02/89-31/01/90

Date	Reading		Date	Henley		Date	Sunnymeads	
	Coliforms	E. Coli		Coliforms	E. Coli		Coliforms	E. Coli
26/06/89	500	220	26/06/89	2,500	340	23/02/89	44,000	1,160
26/07/89	21,000	1,700	24/07/89	15,100	610	12/06/89	39,000	900
23/08/89	25,000	520	21/08/89	26,700	540	25/07/89	2,200	160
19/09/89	23,000	520	21/09/89	20,800	920	23/08/89	18,100	870
						19/09/89	93,000	1,610
						05/12/89	34,000	24,000
						24/01/89	106,000	2,830

Date	Egham		Date	Chartsey		Date	Walton	
	Coliforms	E. Coli		Coliforms	E. Coli		Coliforms	E. Coli
12/06/89	5,000	1,000	23/02/89	30,000	910	23/02/89	45,000	2,710
11/07/89	5,200	460	12/06/89	7,000	500	12/06/89	10,000	800
25/07/89	7,800	980	11/07/89	3,300	1,140	11/07/89	3,800	780
31/07/89	3,600	280	25/07/89	4,900	1,880	25/07/89	2,100	380
07/08/89	2,700	250	31/07/89	6,300	430	31/07/89	227,000	1,420
14/08/89	7,800	260	07/08/89	1,500	350	07/08/89	4,900	140
22/08/89	19,000	1,310	14/08/89	4,100	370	14/08/89	22,800	290
23/08/89	5,000	260	22/08/89	4,900	410	22/08/89	9,900	490
29/08/89	10,200	340	23/08/89	2,800	250	23/08/89	3,600	240
04/09/89	3,100	200	29/08/89	6,700	440	29/08/89	5,300	400
11/09/89	29,500	11,200	04/09/89	2,800	310	04/09/89	39,000	440
18/09/89	43,000	670	11/09/89	1,400	900	11/09/89	1,300	440
19/09/89	36,000	300	18/09/89	28,300	1,460	18/09/89	3,800	730
25/09/89	5,200	360	19/09/89	6,500	610	19/09/89	4,500	770
03/10/89	30,000	11,800	25/09/89	5,700	590	25/09/89	5,200	380
09/10/89	68,000	2,820	03/10/89	14,800	800	03/10/89	8,900	570
16/10/89	18,000	4,000	09/10/89	70,000	1,530	09/10/89	15,200	800
23/10/89	768,000	20,600	16/10/89	13,000	1,000	16/10/89	16,000	1,420
02/11/89	36,000	8,300	23/10/89	15,000	1,980	23/10/89	13,600	1,210
09/11/89	18,000	-	02/11/89	16,000	2,600	02/11/89	20,000	2,500
05/12/89	15,300	1,040	09/11/89	13,000	-	09/05/89	5,100	-
24/01/90	76,000	2,670	05/12/89	20,100	1,130	05/12/89	48,000	1,440
			24/01/90	31,200	2,470	24/01/90	31,200	2,470

Date	Hampton Court		Date	Teddington		
	Coliforms	E Coll		Coliforms	E Coll	Salmonella
11/07/89	8,400	500	20/02/89	46,000	6,400	< 1
25/07/89	1,300	290	21/03/89	157,000	4,600	< 1
14/08/89	7,800	430	27/04/89	58,000	2,000	< 1
22/08/89	1,800	300	30/05/89	10,000	700	< 1
23/08/89	1,900	170	19/06/89	10,600	750	< 1
29/08/89	3,400	470	25/07/89	6,100	480	10
04/09/89	2,400	220	31/07/89	103,000	1,000	
18/09/89	2,300	320	07/08/89	3,400	270	
19/09/89	3,200	510	14/08/89	30,500	690	
25/09/89	1,100	290	22/08/89	27,000	700	
03/10/89	2,600	380	23/08/89	13,400	330	< 1
09/10/89	4,500	380	29/08/89	34,000	1,420	
16/10/89	2,300	410	04/09/89	23,000	1,400	
23/10/89	11,200	980	11/09/89	1,100	970	
02/11/89	3,700	1,500	18/09/89	27,400	960	
09/11/89	3,500	-	19/09/89	19,400	1,030	< 1
			25/09/89	103,000	2,590	
			03/10/89	11,200	370	
			09/10/89	40,000	1,300	
			16/10/89	30,000	2,700	
			23/10/89	34,000	2,560	
			30/10/89	-	-	< 1
			02/11/89	66,000	5,100	
			09/11/89	31,900	-	
			20/11/89	-	-	< 1
			05/12/89	-	-	< 1
			24/01/90	-	-	1

EUROPEAN COMMUNITY SURFACE WATER ABSTRACTION DIRECTIVE
BACTERIAL RESULTS SUMMARY 1989

1. Introduction

Water samples were collected quarterly at the 11 surface water abstraction points within the Biology (West) Area. The samples were examined for the presence of coliform bacteria, indicative of faecal contamination. This is a summary of the results and compares them with the A2 guide levels of the EC directive, (Total coliforms 5000/100ml, *Escherichia coli* 2000/100ml).

2. Methods

Numbers of Total Coliforms (TC) and *E. coli* (Ec) were determined using the standard membrane filtration method and sodium lauryl sulphate broth in accordance with HMSO Report on Public Health and Medical Subjects No 71.

The quarterly results for the last six years are shown in Figures 1-11, as are the moving averages based on results from the previous four quarters.

The compliance of the 1989 results with the EC directive A2 guide level is given in Table 1 and the four quarterly reports form Appendix 1.

3. Results

3.1 *Reservoir Abstraction*

All samples from Grimsbury and Farmoor were well within the Total Coliform and *E. coli* guide levels, (Table 1, Figures 1 and 2).

3.2 *Thames Tributaries Abstractions*

All four sites passed the *E. coli* guide value at each quarterly sampling, (Table 1, Figures 3-6).

The abstraction point on the River Windrush achieved 100% compliance with the Total Coliform guide level (Table 1, Figure 4). However, the TC guide level was exceeded on the River Coln by two quarterly samples, once on the River Kennet and three times on the Tillingbourne, (Table 1, Figures 3, 5 and 6).

3.3 *Main River Thames Abstractions*

The River Thames site at Chertsey achieved total compliance with the *E. coli* guide level, while the other four sites each failed on a single occasion, (Table 1, Figures 7-11).

Other than a single pass at Walton, all five sites consistently exceeded the Total Coliform guide level during 1989.

4. Discussion

The results of the 1989 survey have the same general pattern of compliance as in previous years, (Table 1).

The surface storage sites at Grimsbury and Farmoor contain low levels of faecal bacteria. Compliance with the A2 guide levels for Total Coliforms and *E. coli* is consistently high.

The tributary abstraction points achieved total compliance with the A2 guide level for *E. coli* but failed that for Total Coliforms intermittently. This is in keeping with past results for these sites.

The repeated failure of the River Thames sites to comply with the A2 guide level for Total Coliforms is typical. Usually these sites pass the *E. coli* guide level.

There appears to have been a slight improvement in the bacterial condition of the Rivers Coln, Windrush and Kennet. On the River Thames contamination with faecal bacteria seems to have increased at Culham, Sunnymeads and Walton.

William E. Yeomans.

William E Yeomans (Biologist)
April 1990

Table 1

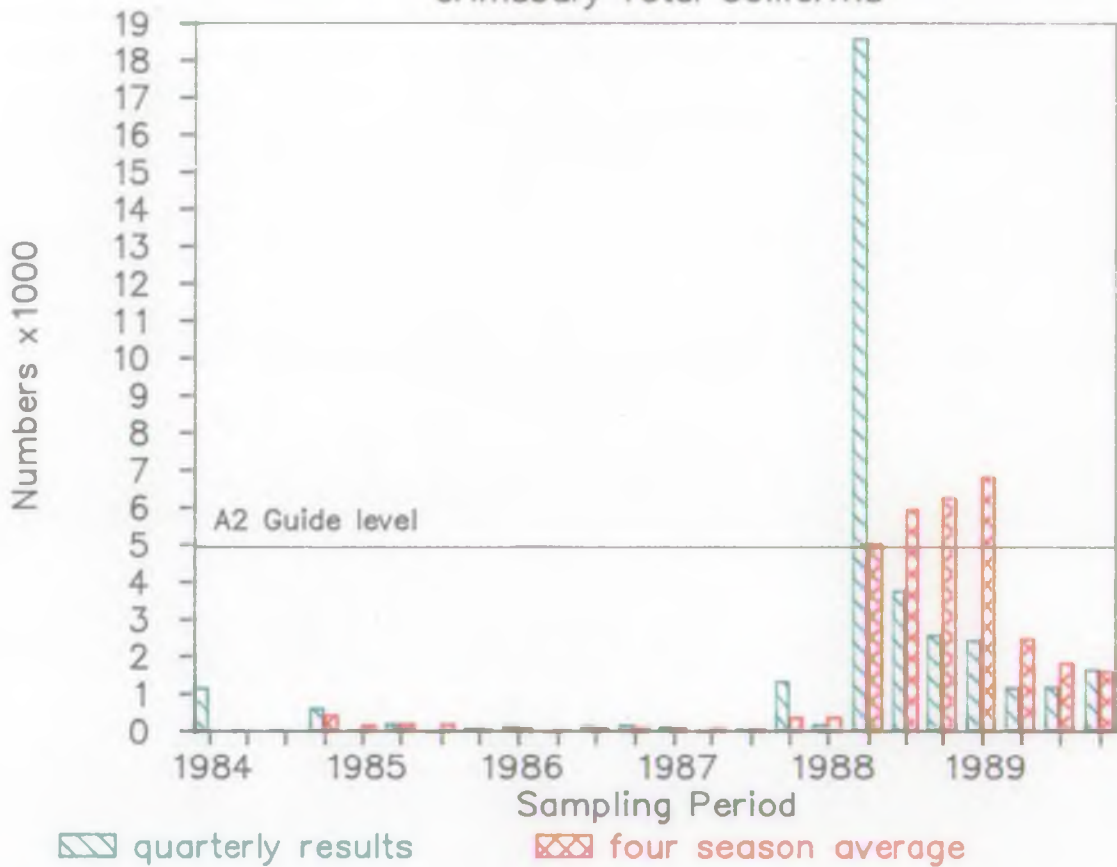
EUROPEAN COMMUNITY SURFACE WATER ABSTRACTION DIRECTIVE COMPLIANCE WITH THE A2 GUIDE LEVEL FOR BACTERIA (1989), QUARTERLY RESULTS.

SITE	TOTAL COLIFORMS	E.coli
Grimsbury Reservoir	PPPP	PPPP
Farmoor Reservoir	PPPP	PPPP
R. Coln, Roundhouse	FPPP	PPPP
R. Windrush, Worsham	PPPP	PPPP
R. Kennet, Fobney	FPPP	PPPP
R. Tillingbourne, Shalford	FFFF	PPPP
R. Thames, Culham	FFFF	FPPP
R. Thames, Sunnymeads	FFFF	PPPF
R. Thames, Egham	FFFF	FPPP
R. Thames, Chertsey	FFFF	PPPP
R. Thames, Walton	FFPF	FPPP

(P = Pass, F = Fail)

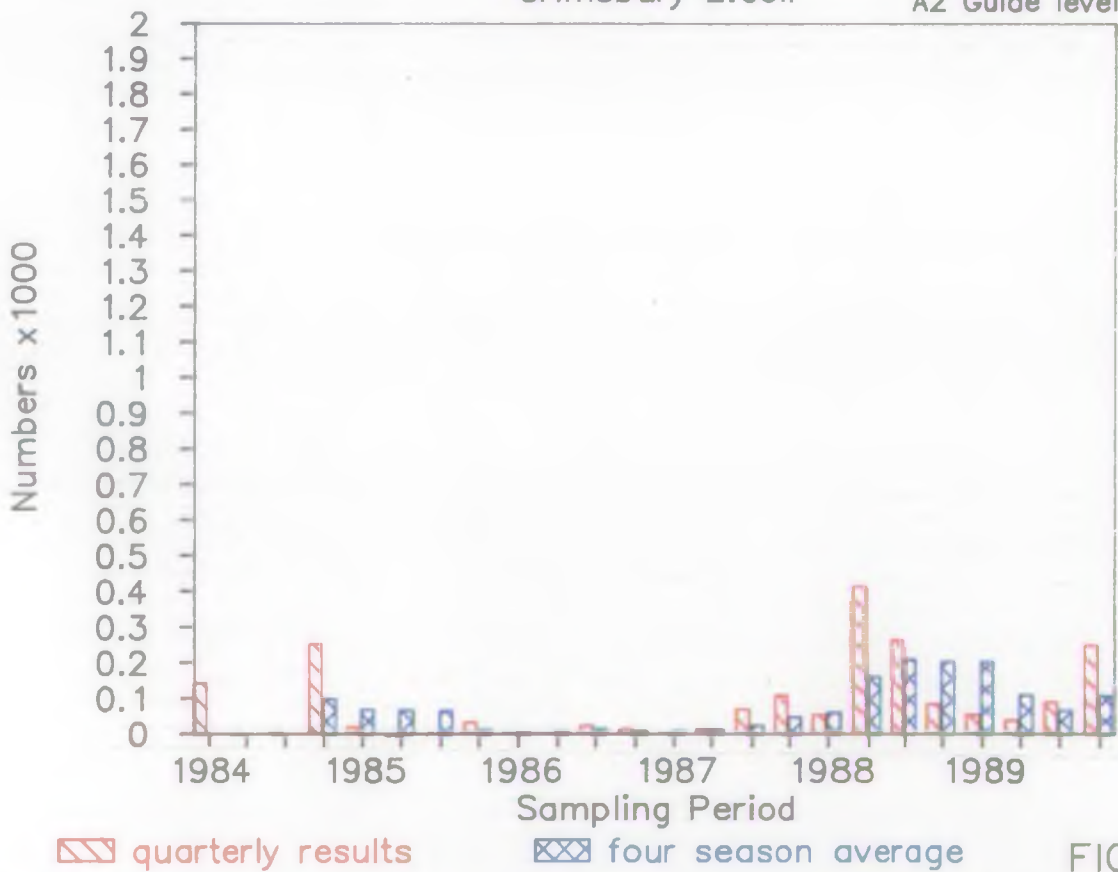
EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Grimsbury Total Coliforms



Grimsbury E.coli

A2 Guide level

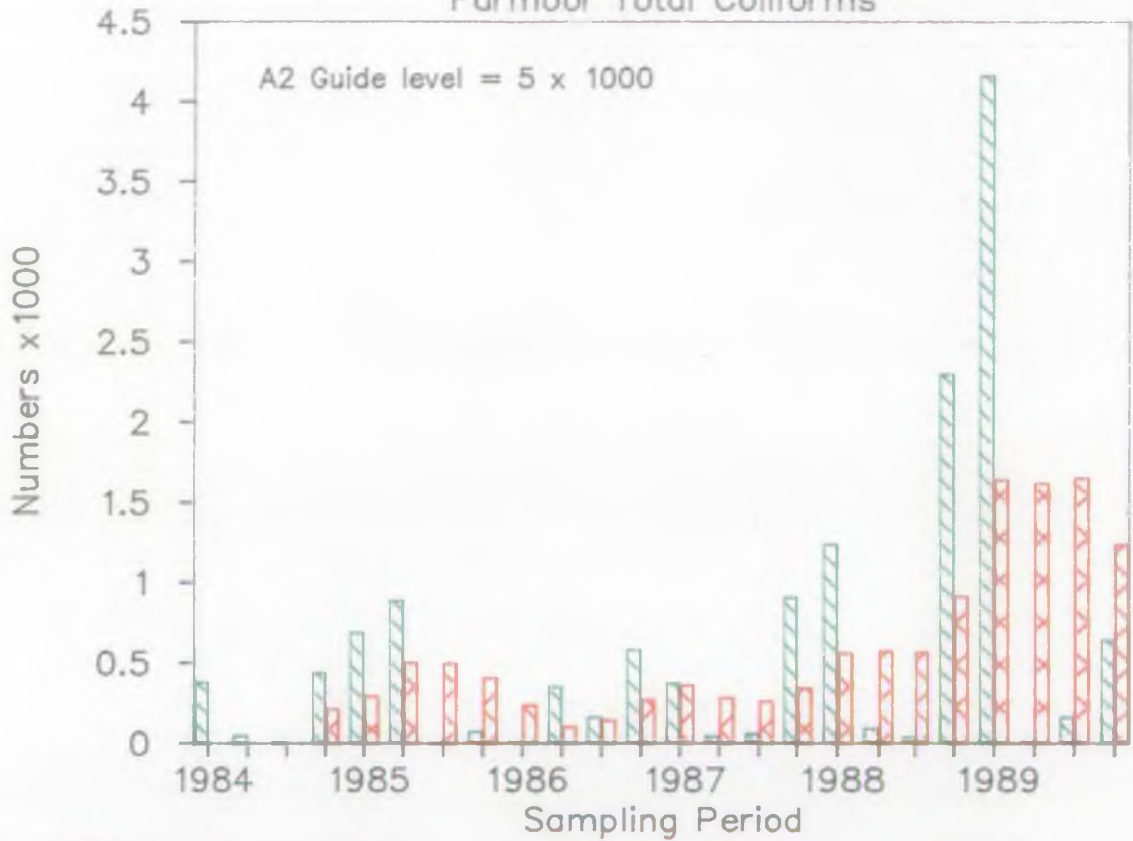


EC9GRIM.DRW

FIG 1

EC ABSTRACTION DIRECTIVE BACTERIOLOGY

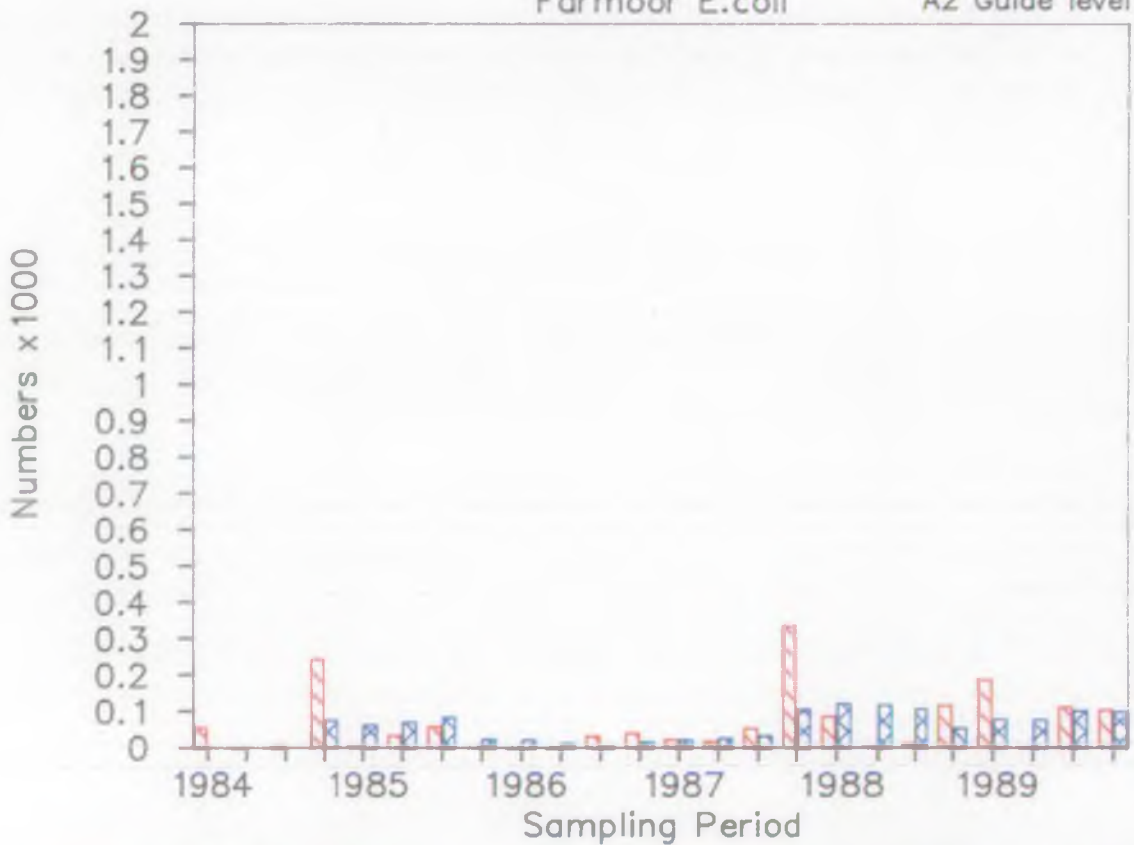
Farmoor Total Coliforms



quarterly results four season average

Farmoor E.coli

A2 Guide level



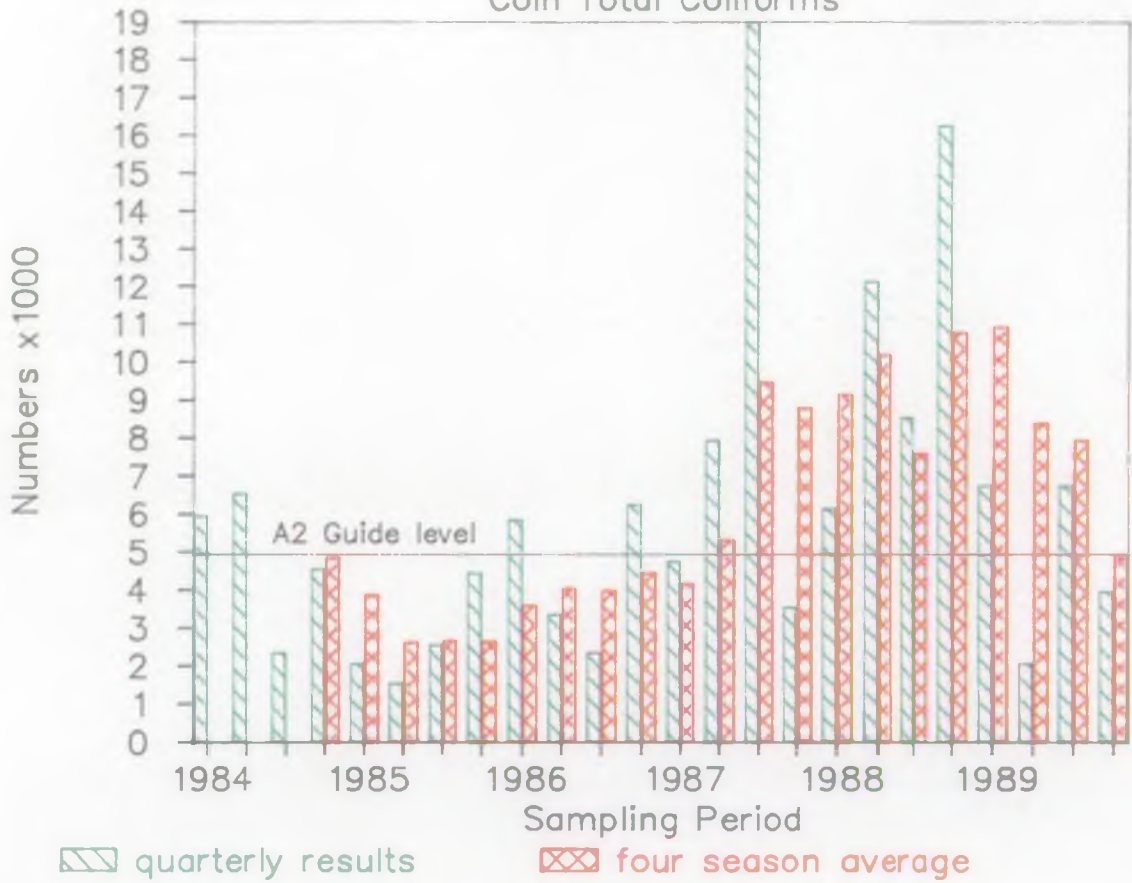
quarterly results four season average

EC9.FARM.DRW

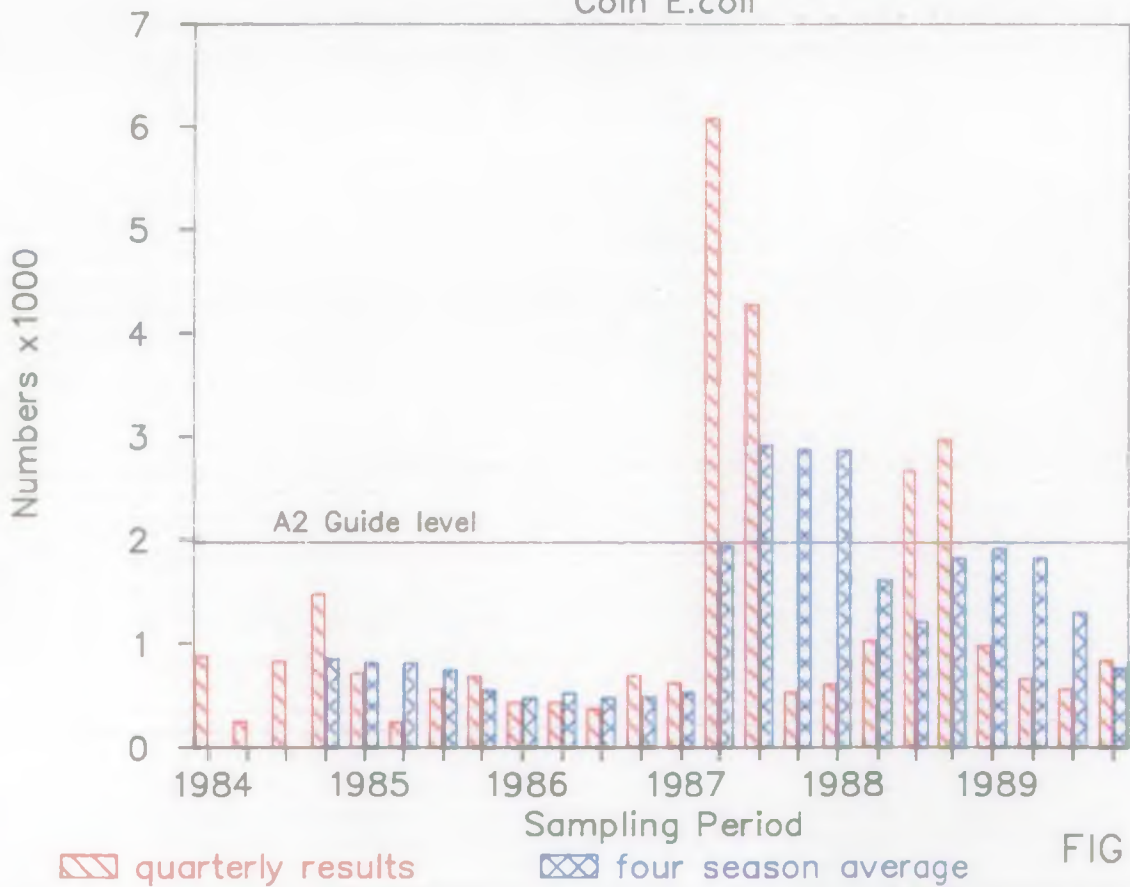
FIG 2

EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Coln Total Coliforms



Coln E.coli

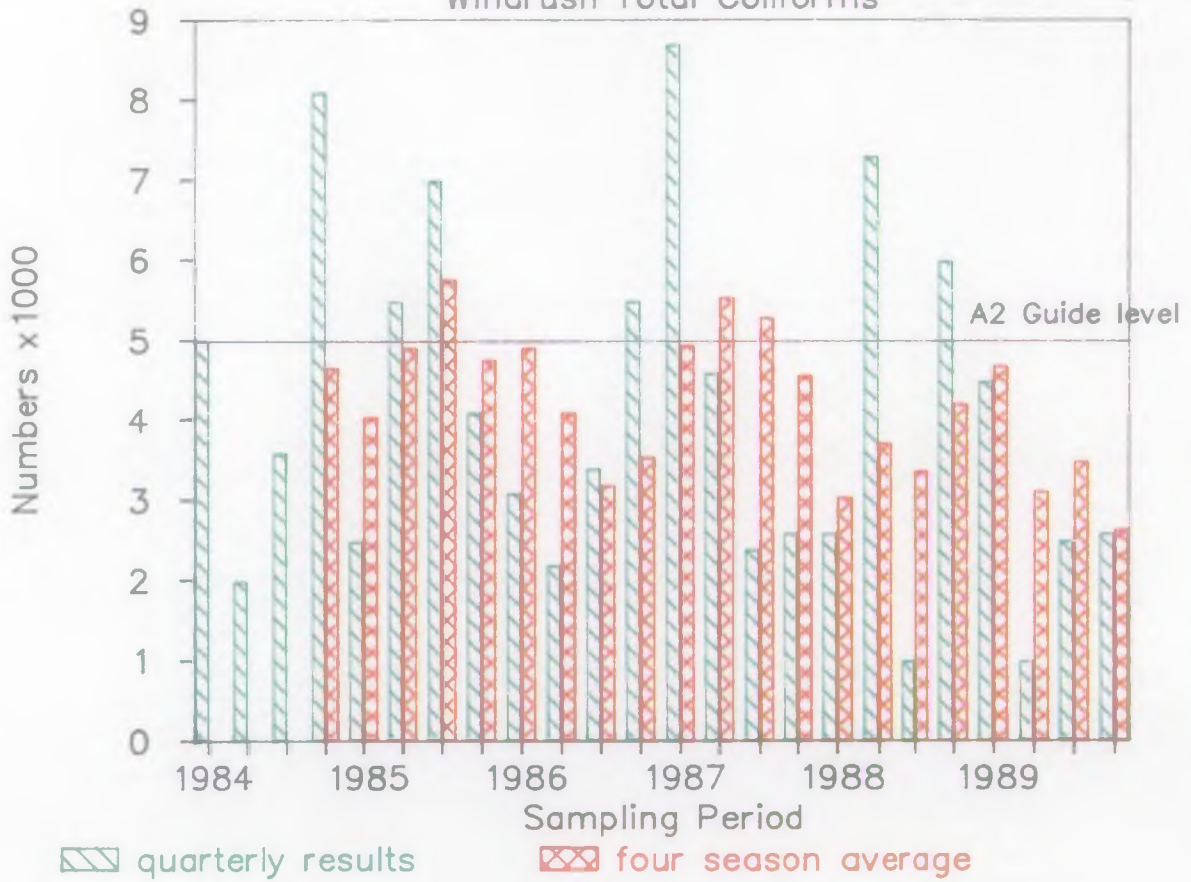


EC9COLN.DRW

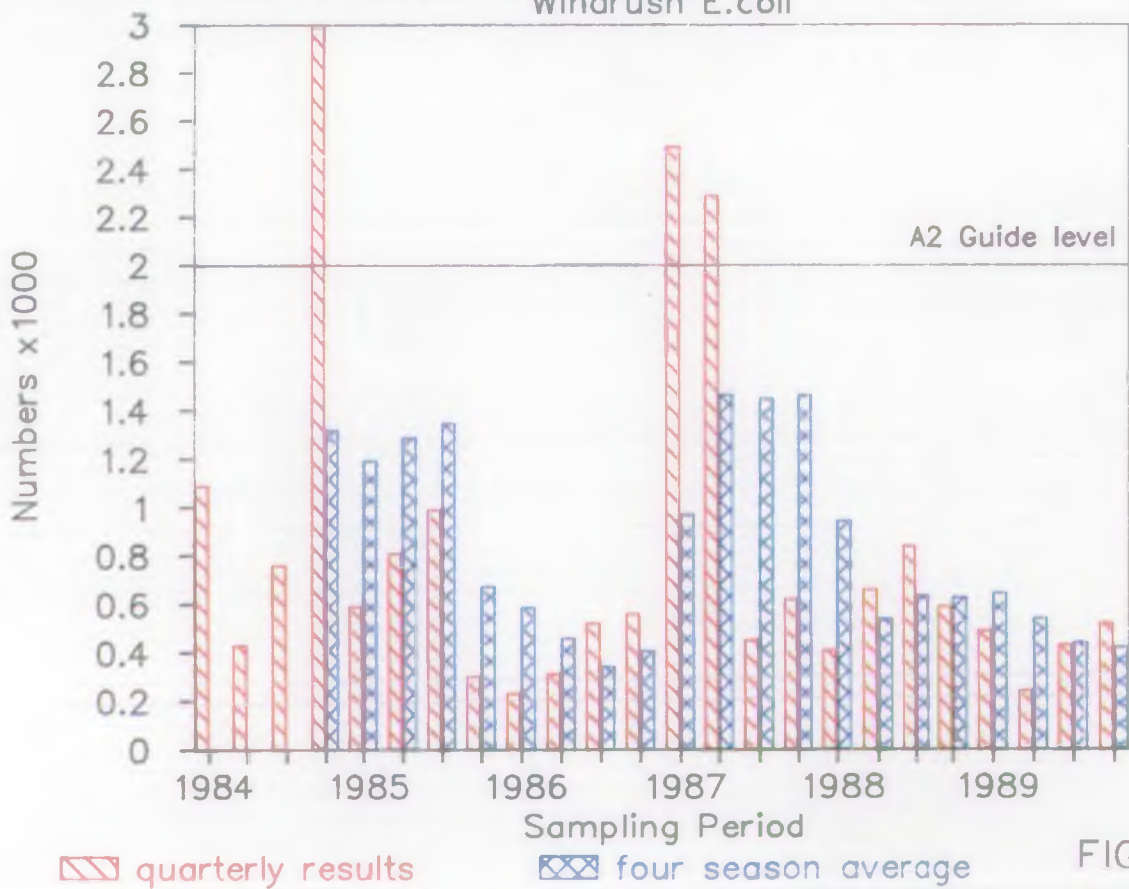
FIG 3

EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Windrush Total Coliforms



Windrush E.coli

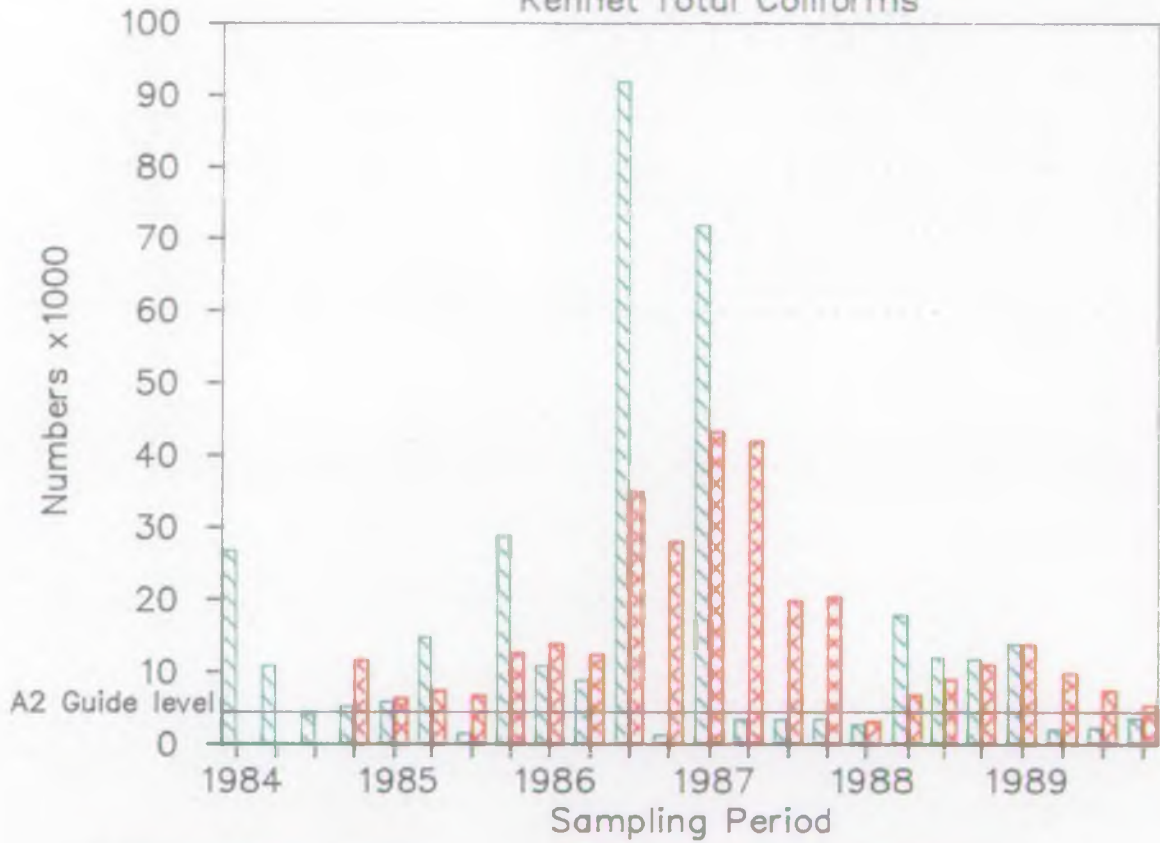


EC9WIND.DRW

FIG 4

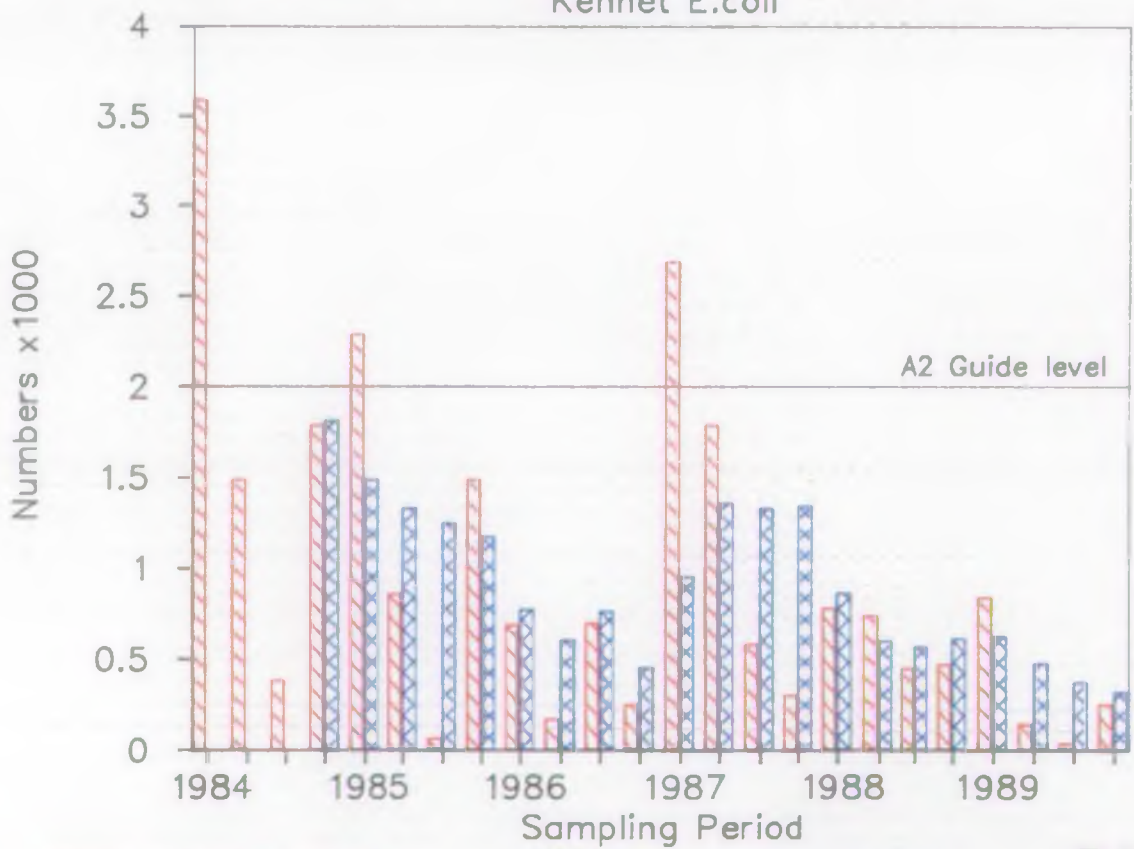
EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Kennet Total Coliforms



▨ quarterly results
 ▨ four season average

Kennet E.coli



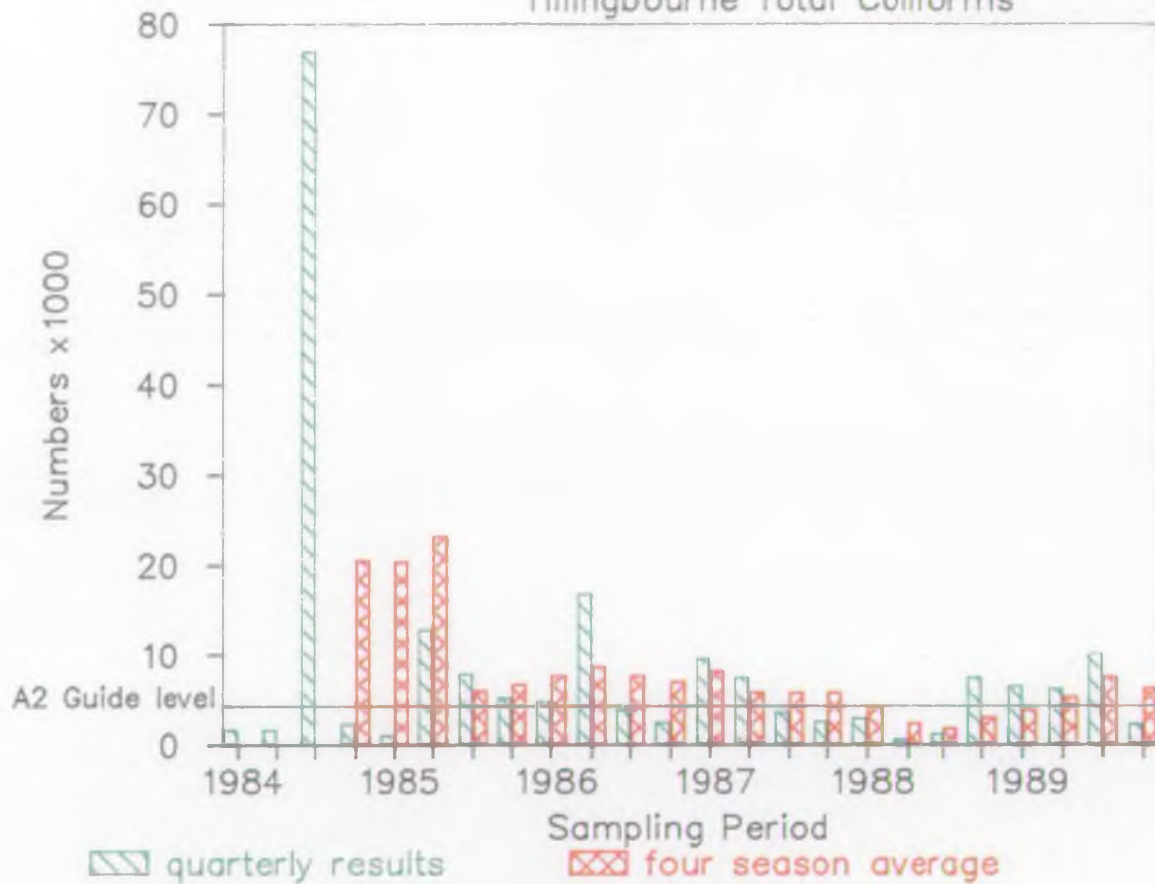
▨ quarterly results
 ▨ four season average

FIG 5

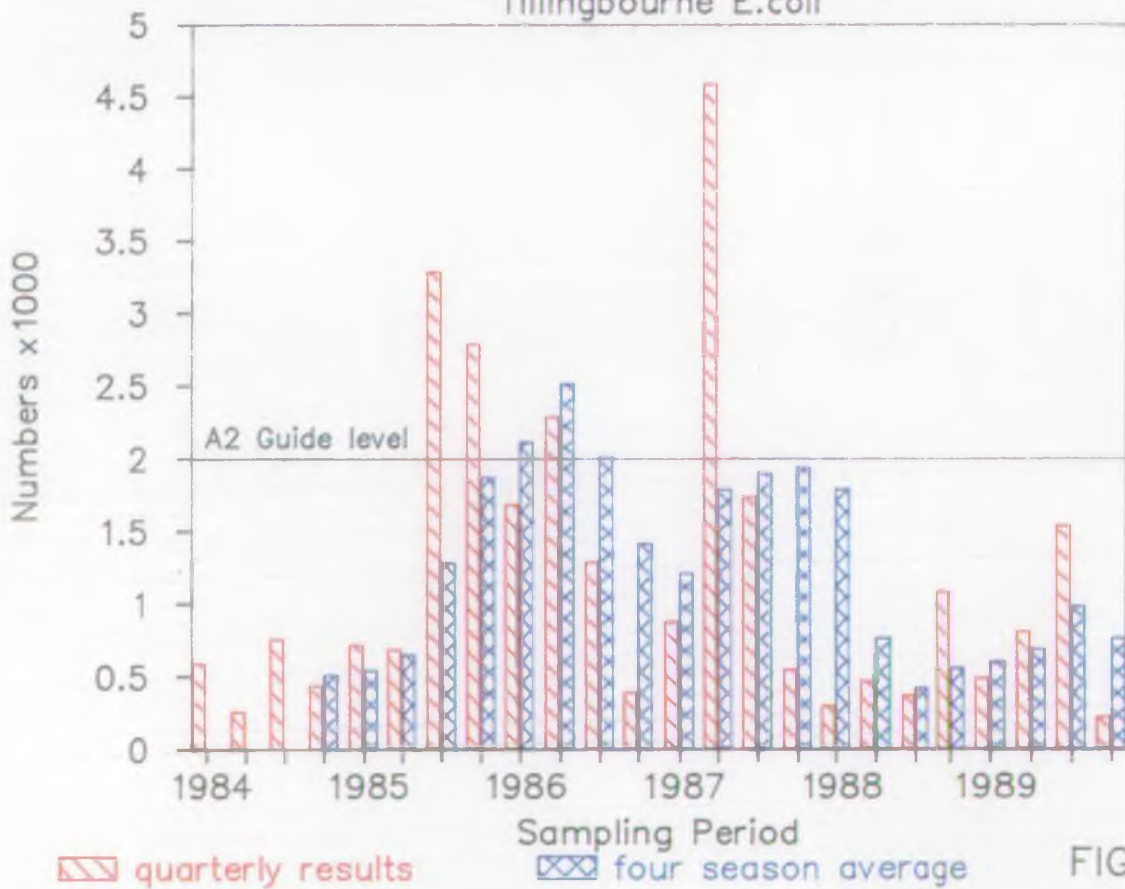
EC9KENN.DRW

EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Tillingbourne Total Coliforms



Tillingbourne E.coli

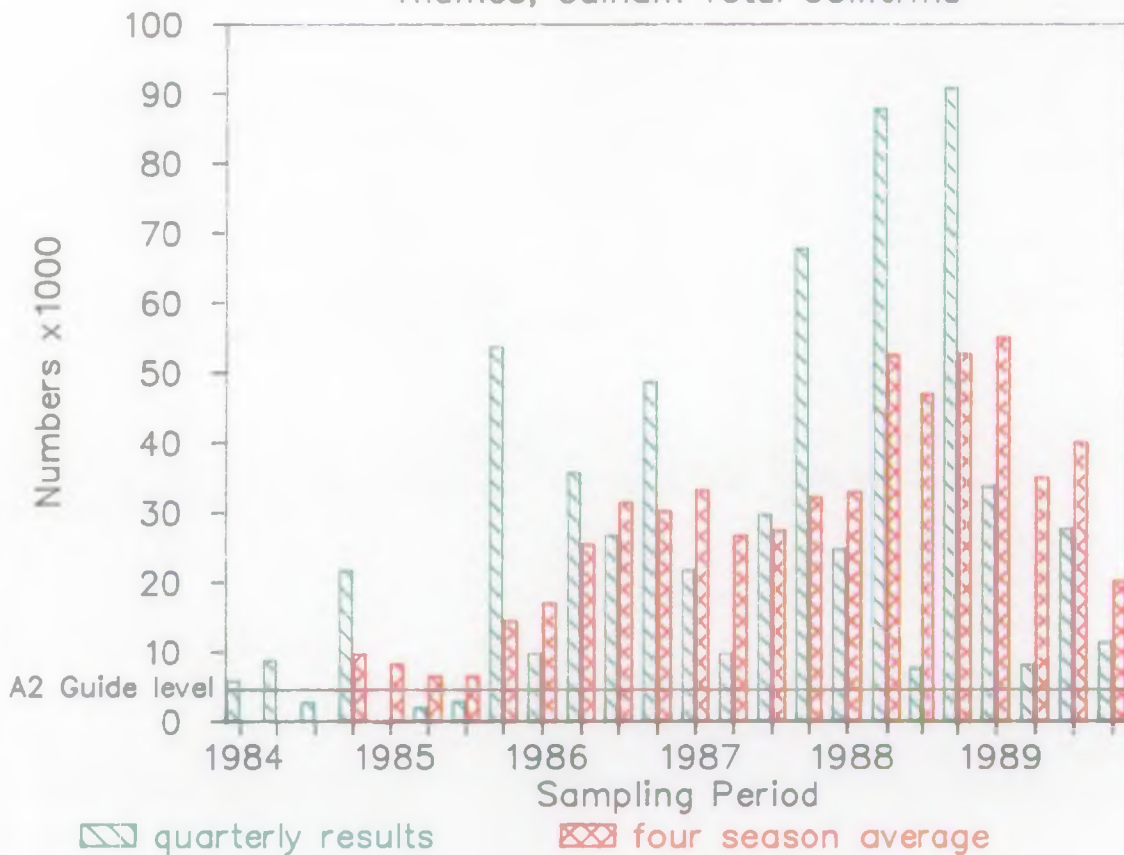


EC9TILL.DRW

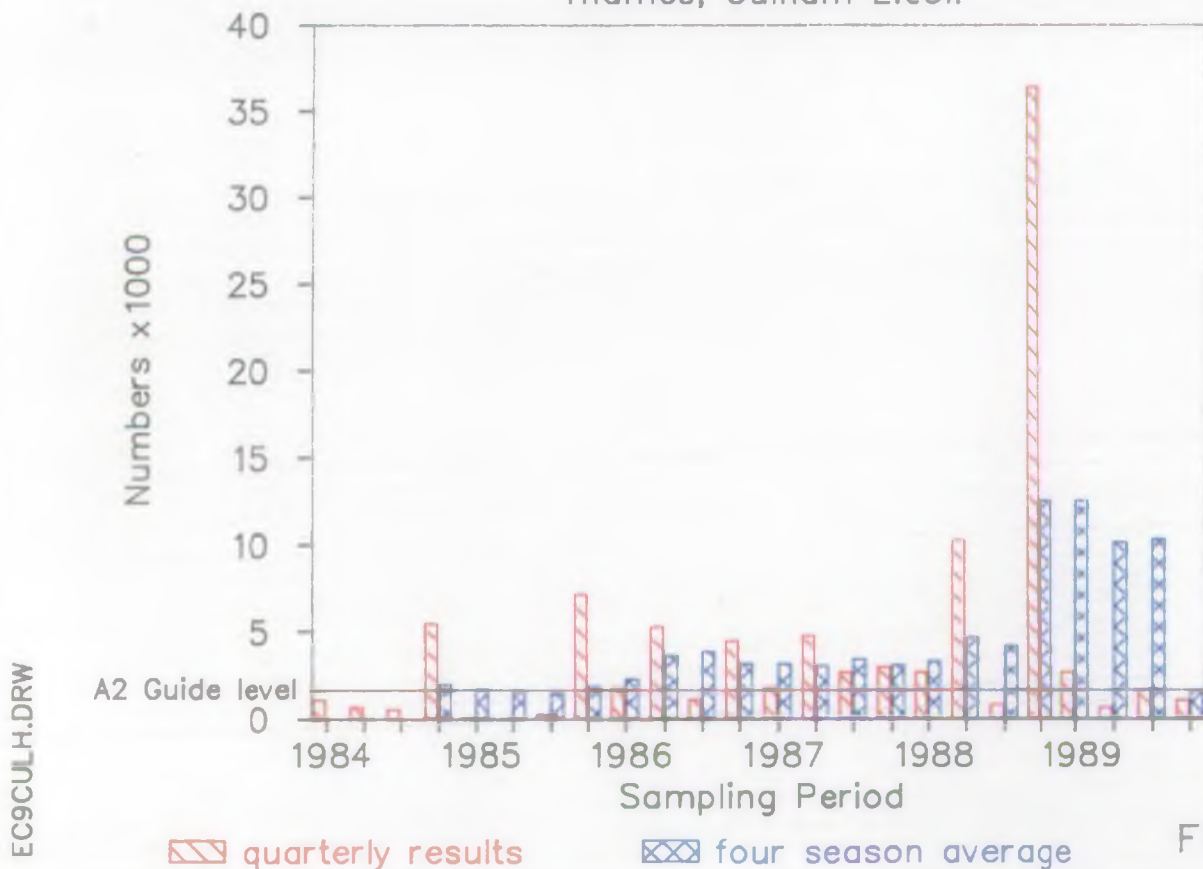
FIG 6

EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Thames, Culham Total Coliforms



Thames, Culham E.coli

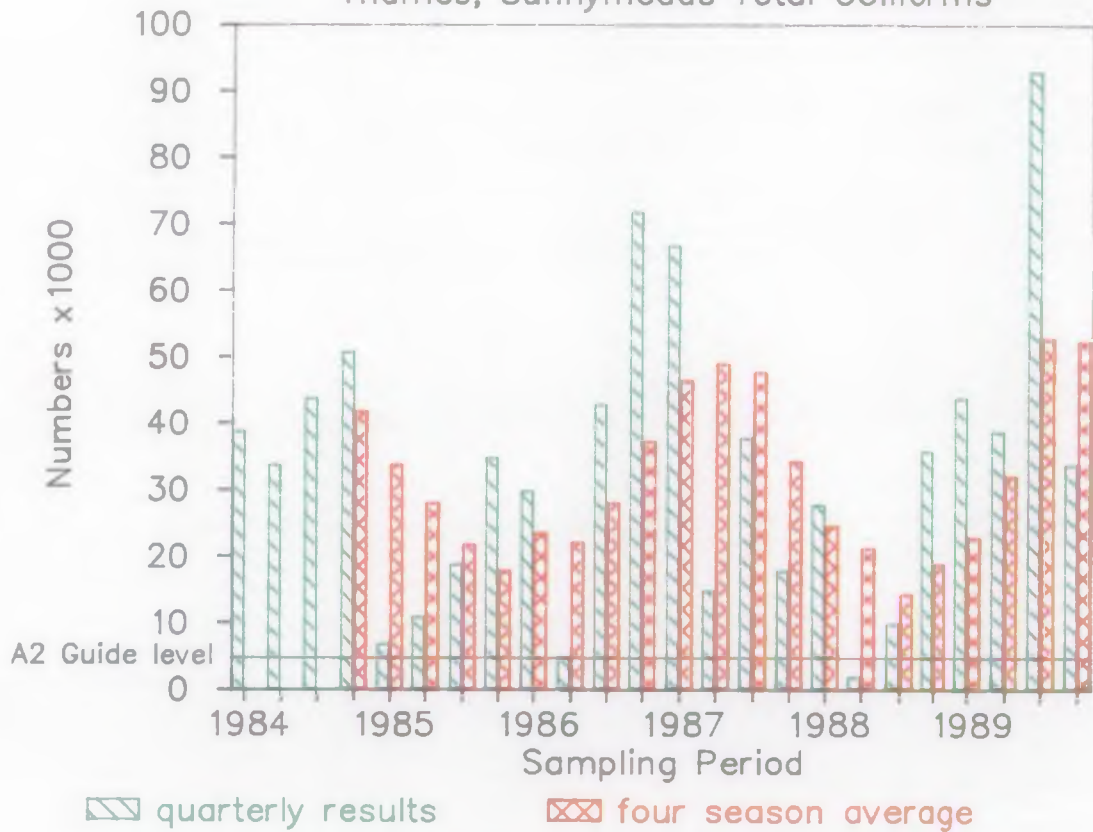


EC9CULH.DRW

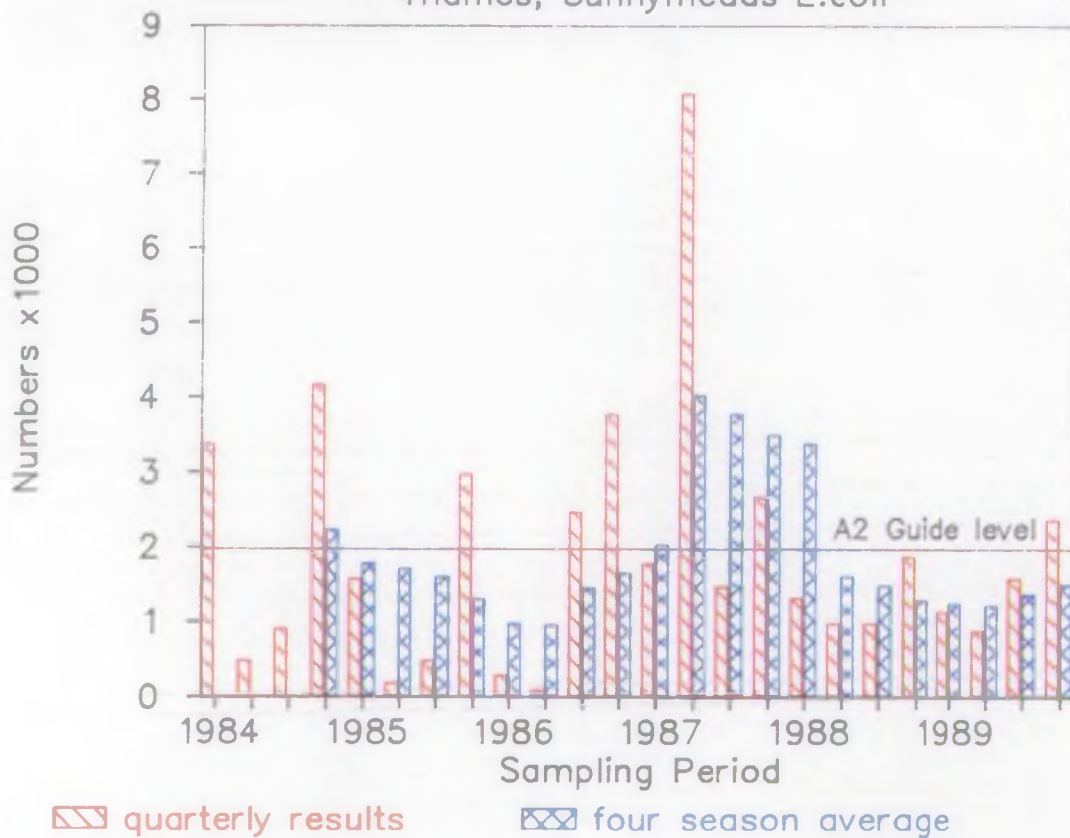
FIG 7

EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Thames, Sunnymeads Total Coliforms



Thames, Sunnymeads E.coli

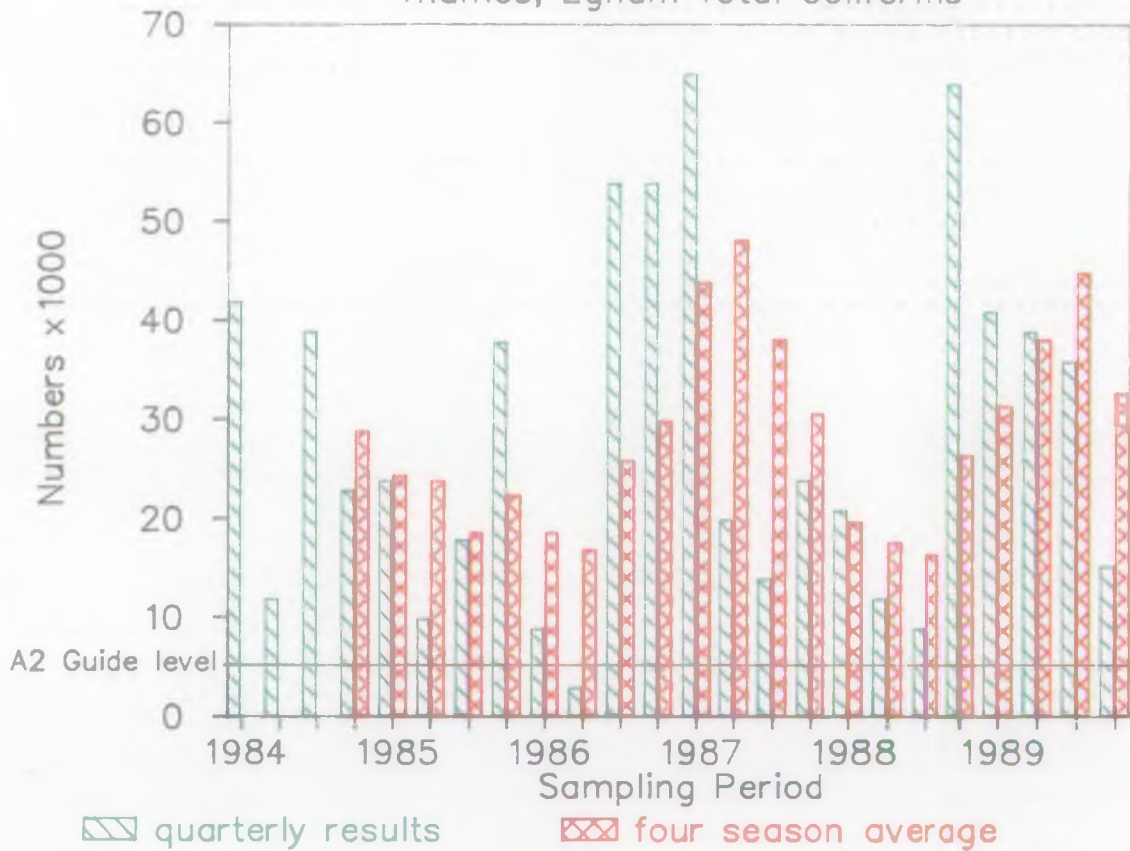


EC9SUNN.DRW

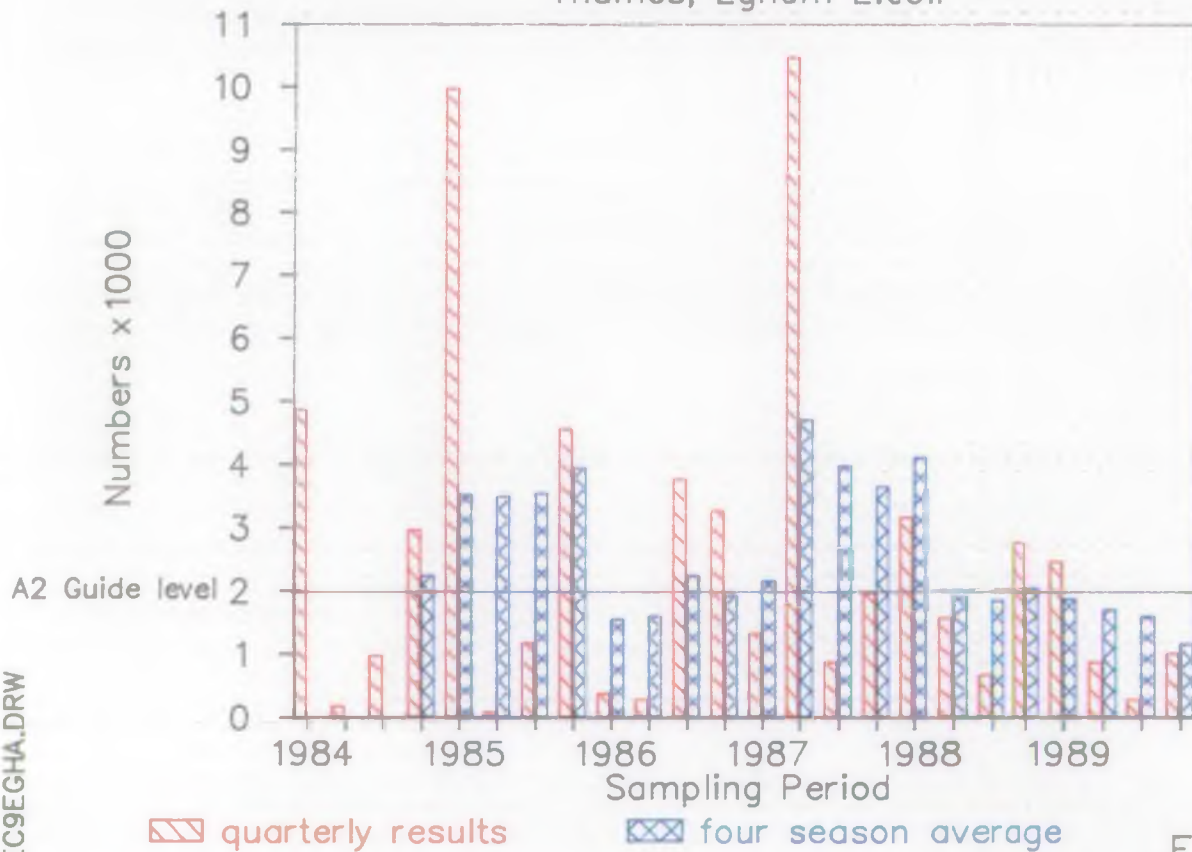
FIG 8

EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Thames, Egham Total Coliforms



Thames, Egham E.coli

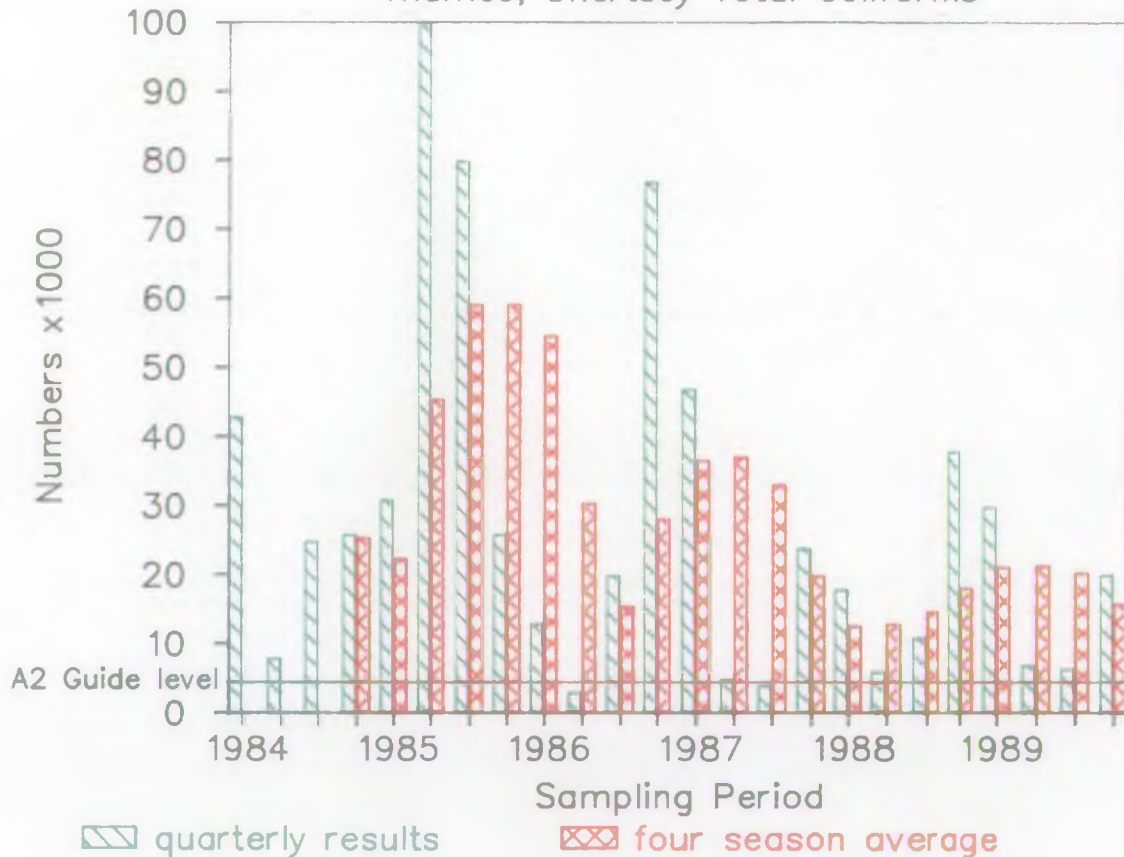


EC9EGHA.DRW

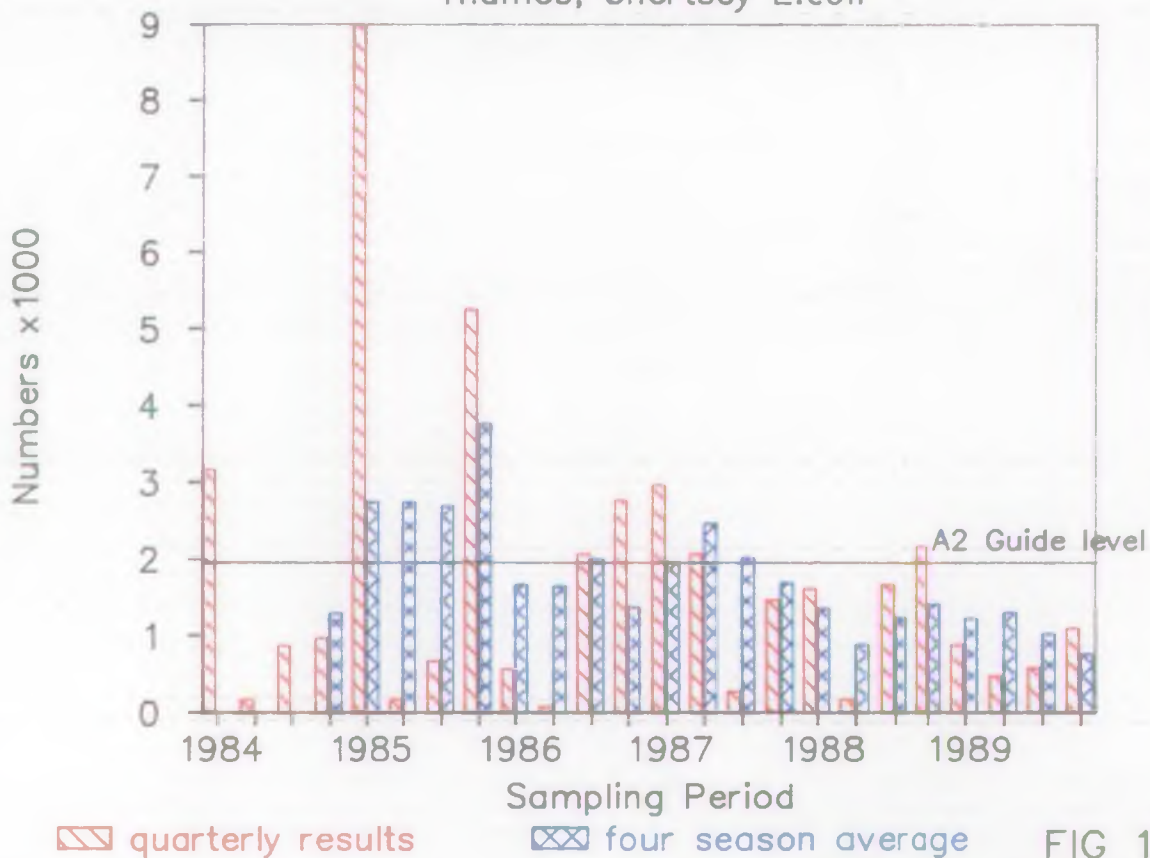
FIG 9

EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Thames, Chertsey Total Coliforms



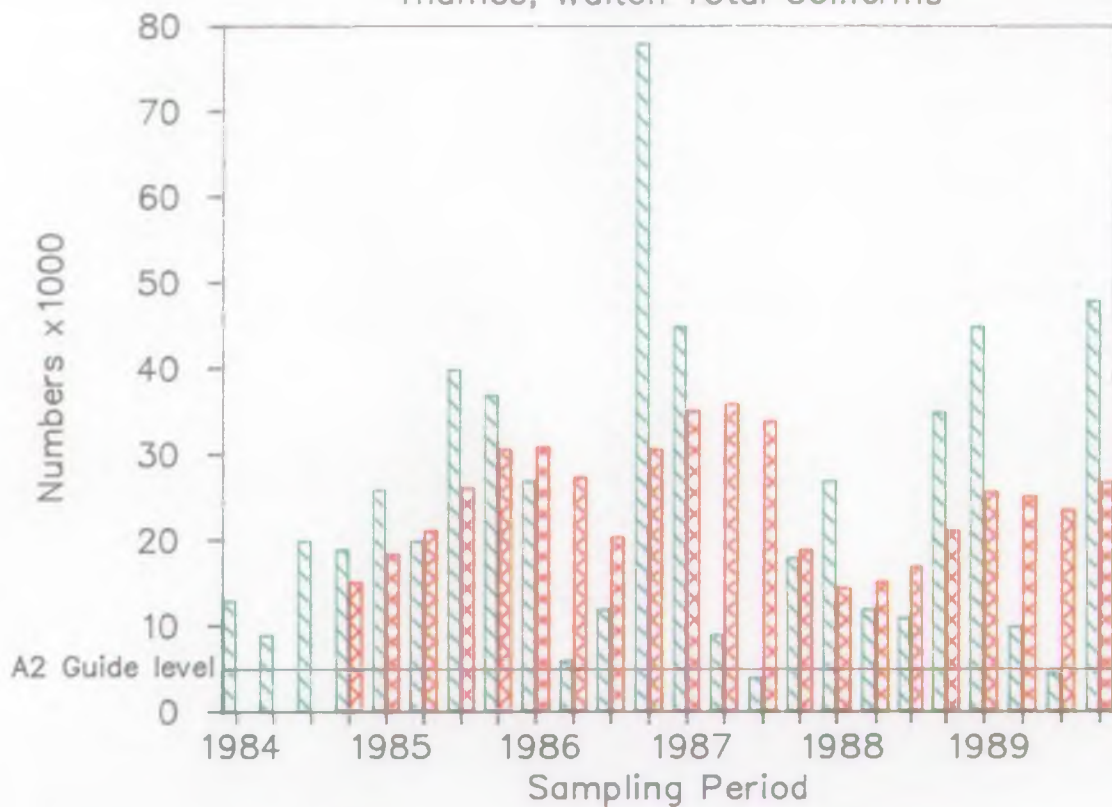
Thames, Chertsey E.coli



EC9CHER.DRW

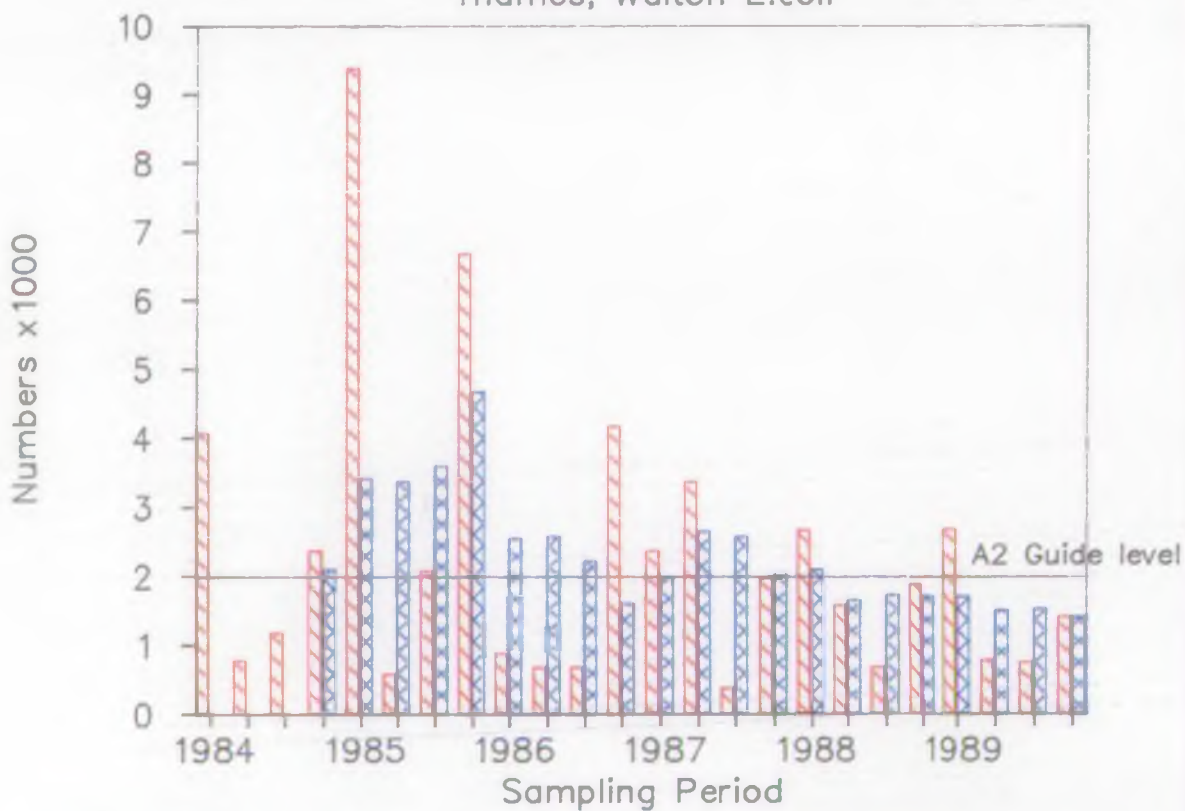
EC ABSTRACTION DIRECTIVE BACTERIOLOGY

Thames, Walton Total Coliforms



▨ quarterly results
 ▨ four season average

Thames, Walton E.coli



▨ quarterly results
 ▨ four season average

FIG 11

EC9WALT.DRW

APPENDIX 1

EUROPEAN COMMUNITY SURFACE WATER ABSTRACTION DIRECTIVE 1989

QUARTERLY REPORTS

To: Chief Biologist
SPO 1,2 & 3 Districts
Biofile / File

EUROPEAN COMMUNITY SURFACE WATER ABSTRACTION DIRECTIVE BACTERIAL SURVEY 1st SAMPLING 1989

Listed below are the EC bacterial results for the first sampling of 1989. Samples were collected on 23/02/89. The standard membrane filtration method was employed for enumeration.

EC ABSTRACTION DIRECTIVE
Bacterial Results First Sampling 1989
(numbers x1000/100ml)

Site	Total Coliforms	E.coli	DATE
Coln, Roundhouse	6.800 f	1.000 p	23.02
Cherwell, Grimsbury	2.460 p	0.060 p	23.02
Windrush, Worsham	4.500 p	0.500 p	23.02
Thames, Farmoor	4.170 p	0.193 p	23.02
Thames, Culham	34.000 f	2.800 f	23.02
Kennet, Fobney	14.000 f	0.850 p	23.02
Tillingbourne, Shalford	6.600 f	0.500 p	23.02
Thames, Egham	41.000 f	2.500 f	23.02
Thames, Chertsey	30.000 f	0.910 p	23.02
Thames, Walton	45.000 f	2.710 f	23.02
Thames, Sunnymeads	44.000 f	1.160 p	23.02

EC Guide values A2 waters
Total Coliforms 5000/100ml
E.coli 2000/100ml
Key: p = pass, f = fail

As normal most sites pass the *E. coli* guide value. The Thames at Culham, Egham and Walton fail, but no abnormally high values were noted. The Total Coliforms guide value is exceeded at eight sites, only Grimsbury, Worsham and Farmoor passing. The Thames at Culham, Egham, Chertsey, Walton, and Sunnymeads shows high levels of coliforms. Culham has improved since the last quarter's very high result.

Richard Ashby-Crane (Biologist)
February 1989
(symphony\area2\blrth902)

Richard Ashby-Crane



I N T E R N A L M E M O R A N D U M

NRA UNIT

REGULATION AND MONITORING

TO: Chief Biologist
SPO 1, 2 and 3 Districts
Biofile/File

FROM: William Yeomans

TELEPHONE: Reading 311422

DATE: 3 August 1989

REF: WY ECA 001

EUROPEAN COMMUNITY SURFACE WATER ABSTRACTION DIRECTIVE BACTERIAL SURVEY
2nd SAMPLING 1989

Listed below are the EC bacterial results for the second sampling of 1989. Samples were collected as dated and the standard membrane filtration method employed for enumeration.

EC ABSTRACTION DIRECTIVE
Bacterial Results Second Sampling 1989
(Numbers x 1000/100ml water)

Site	Total Coliforms	E.coli	Date
Coln, Roundhouse	2.100 p	0.680 p	20/06
Cherwell, Grimsbury	1.200 p	0.044 p	26/06
Windrush, Worsham	1.000 p	0.250 p	20/06
Thames, Farmoor	0.010 p	0.003 p	20/06
Thames, Culham	8.300 f	0.740 p	20/06
Kennet, Fobney	2.100 p	0.150 p	26/06
Tillingbourne, Shalford	6.300 f	0.820 p	22/06
Thames, Egham	39.000 f	0.900 p	12/06
Thames, Chertsey	7.000 f	0.500 p	12/06
Thames, Walton	10.000 f	0.800 p	12/06
Thames, Sunnymeads	39.000 f	0.900 p	12/06

EC Guide Values A2 Waters
Total Coliforms 5000/100ml
E.coli 2000/100ml
Key: p = pass, f = fail



All sites pass the E.coli guide value. The stored water sources at Farmoor and Grimsbury also pass the Total Coliforms guide level, as do the abstraction points on the tributaries Coln, Windrush and Kennet. The abstraction from the River Tillingbourne and those from the Thames at Culham, Egham, Chertsey, Walton and Sunnymeads all fail to meet the Total Coliforms guide value. However, each site failing to meet the guideline has a total coliform count within the range previously recorded at the site.

William E. Yeomans.

William E Yeomans
Biologist

3 August 1989



NATIONAL RIVERS AUTHORITY
THAMES REGION
BIOLOGY (WEST)



BIOLOGY LABORATORY REPORT

TO: JOHN STEEL
AREA BIOLOGIST (WEST)

FROM: WILLIAM E YEOMANS
BIOLOGIST

DATE: 30 NOVEMBER 1989

TEL: 0734 311422

FILE REF: WYB(ECA)002

CC: NIGEL MARSHALL
PRINCIPAL POLLUTION OFFICER
(NOS 1 AND 2 DISTRICTS)

MARTIN WHITELAND
SENIOR POLLUTION OFFICER
(NO 1 DISTRICT)

CHRIS WHEELER
DISTRICT POLLUTION OFFICER
(NO 2 DISTRICT)

GERRY CLAYDON
SENIOR POLLUTION OFFICER
(NO 3 DISTRICT)

DEREK TINSLEY
AREA BIOLOGIST (EAST)
WALTHAM CROSS

FILE

European Community Surface Water Abstraction Directive Bacterial Survey,
3rd Quarter 1989

Listed below are the E.C. bacterial results for the third quarter of 1989. Samples were collected as dated and the standard membrane filtration method was employed for enumeration.

E.C. Abstraction Directive

Bacterial Results Third Quarter 1989
(Numbers x 1000/100ml Sample)

<u>Site</u>	<u>Total Coliforms</u>	<u>E. coli</u>	<u>Date</u>
Coln, Roundhouse	6.800 f	0.580 p	21/09
Cherwell, Grimsbury	1.220 p	0.095 p	21/09
Windrush, Worsham	2.500 p	0.440 p	21/09
Thames, Farmoor	0.170 p	0.118 p	21/09
Thames, Culham	27.900 f	1.820 p	21/09
Kennet, Fobney	2.400 p	0.040 p	19/09
Tillingbourne, Shalford	10.300 f	1.550 p	03/10
Thames, Egham	36.000 f	0.300 p	19/09
Thames, Chertsey	6.500 f	0.610 p	19/09
Thames, Walton	4.500 p	0.770 p	19/09
Thames, Sunnymeads	93.000 f	1.610 p	19/09

E.C. Guide Values A2 Waters: Total Coliforms 5000/100ml
E.coli 2000/100ml

Key: p = pass, f = fail



NRA

Comments

All sites passed the E. coli guide value. The stored water facilities at Grimsbury and Farmoor, the abstraction points on the tributaries Windrush and Kennet and the Thames at Walton all passed the Total Coliforms guide level. Sites on the River Thames at Culham, Egham, Chertsey and Sunnymeads failed the Total Coliforms guidelines, as did the abstraction points on the tributaries Coln and Tillingbourne. The Total Coliform count at Sunnymeads was the highest on record and that at Shalford, on the Tillingbourne, was the highest recorded since 1986. All other sites exceeding the Total Coliforms guide value did so within the range previously recorded at each site.

William E. Yeomans.

William E Yeomans
Biologist

NATIONAL RIVERS AUTHORITY
THAMES REGION
BIOLOGY (WEST)



BIOLOGY LABORATORY REPORT

TO: JOHN STEEL
AREA BIOLOGIST (WEST)

FROM: WILLIAM E YEOMANS
BIOLOGIST

DATE: 8 DECEMBER 1989

TEL: 0734 311422

FILE REF: WYB(ECA)003

CC: NIGEL MARSHALL
PRINCIPAL POLLUTION OFFICER
(NOS 1 AND 2 DISTRICTS)

MARTIN WHITELAND
SENIOR POLLUTION OFFICER
(NO 1 DISTRICT)

CHRIS WHEELER
DISTRICT POLLUTION OFFICER
(NO 2 DISTRICT)

GERRY CLAYDON
SENIOR POLLUTION OFFICER
(NO 3 DISTRICT)

DEREK TINSLEY
AREA BIOLOGIST (EAST)
WALTHAM CROSS

FILE

European Community Surface Water Abstraction Directive Bacterial Survey,
4th Quarter 1989

Listed below are the E.C. bacterial results for the fourth quarter of 1989. Samples were collected as dated and the standard membrane filtration method was employed for enumeration.

E.C. Abstraction Directive

Bacterial Results Fourth Quarter 1989
(Numbers x 1000/100ml Sample)

<u>Site</u>	<u>Total Coliforms</u>	<u>E. coli</u>	<u>Date</u>
Coln, Roundhouse	4.000 p	0.860 p	04/12
Cherwell, Grimsbury	1.680 p	0.256 p	04/12
Windrush, Worsham	2.600 p	0.530 p	04/12
Thames, Farmoor	0.650 p	0.110 p	04/12
Thames, Culham	11.600 f	1.190 p	04/12
Kennet, Fobney	3.700 p	0.260 p	05/12
Tillingbourne, Shalford	2.400 p	0.230 p	05/12
Thames, Egham	15.300 f	1.040 p	05/12
Thames, Chertsey	20.100 f	1.130 p	05/12
Thames, Walton	48.000 f	1.440 p	05/12
Thames, Sunnymeads	34.000 f	2.400 f	05/12

E.C. Guide Values A2 Waters: Total Coliforms 5000/100ml
E.coli 2000/100ml

Key: p = pass, f = fail



Comments

Other than the Thames at Sunnymeads, all sites passed the E. coli guide value. The E. coli level detected at Sunnymeads was, however, within the range of values previously recorded at this site.

The stored water facilities at Grimsbury and Farmoor and the abstraction points on the tributaries Coln, Windrush, Kennet and Tillingbourne passed the Total Coliform guide levels. Samples from the abstraction points on the River Thames at Culham, Egham, Chertsey, Walton and Sunnymeads all exceeded the Total Coliform guide value. Of the Total Coliform count, Walton was marginally the highest on record for that site. All other sites exceeding the Total Coliforms guide value did so within the range previously recorded at each site.

William E. Yeomans.

William E Yeomans
Biologist